ontana Outdoors

Montana Outdoors

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THE COVER: Skiing through the Bob Marshall Wilderness (see story page 24) is perhaps an unusual way to spend the Christmas holiday. But as Steve Gilbert's front cover photo illustrates, Christmas is a beautiful time to be outdoors. On our back cover, Montana artist Takehiro Taira has captured with brushstrokes Montana's "waddling pincushion," the porcupine. For more about this interesting but often maligned rodent, turn to Ken Walcheck's article beginning on page 5.

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The Editor's Column

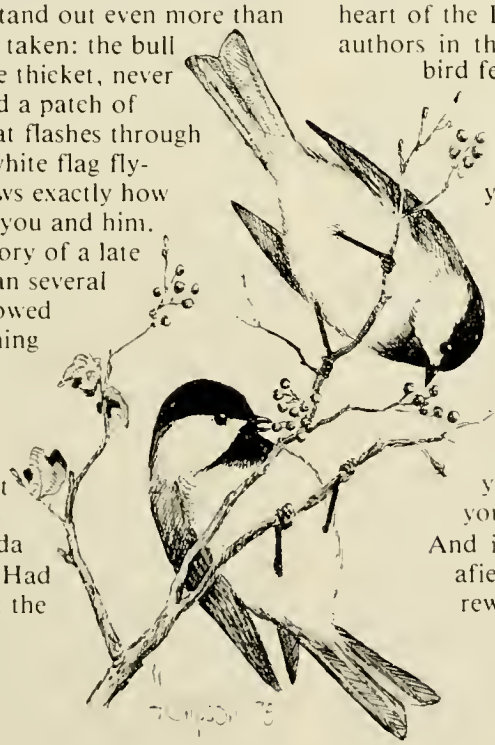
Hunting seasons are mostly behind us for another year, and the memories are many and pleasant. Yet, the closing of each hunting season brings a strange feeling of relief, too. No more getting up in the middle of the night, no more bone-wearying treks through rugged terrain, no more leaky waders and no more plucking decoys out of icy water.

Instead of spending the evening poring over maps and organizing gear, it's time to sit in a soft chair by the fireplace and reminisce—memories, after all, are half the enjoyment of hunting. If you're like me, you'll remember the shots you missed far longer than the ones you made—the pheasant that got up under your feet and somehow escaped unscathed, the mallard that buzzed the blind instead of the decoys, nearly knocking your hat off. The calamities, too, tend to stick in the memory longer than the days when everything went right, especially if you were unlucky enough to have witnesses.

Take, for example, the day we had the sage grouse cornered. We had it on good authority that a large flock of sage grouse was spending every afternoon in a relatively small patch of sagebrush. My young Brittany spaniel was to do the pointing honors. I think he would have done just fine, but I'll never know. Because, just as we stepped into the cover, a jackrabbit flushed under his nose, and off they went hell-bent-for-election through the sage. Grouse filled the air in all directions, and we never got to fire a shot.

Sometimes the memories that stand out even more than the shots missed are the shots not taken: the bull elk that drifts through a lodgepole thicket, never revealing more than a leg here and a patch of rump there; the whitetail buck that flashes through a clearing, antlers gleaming and white flag flying; the trophy antelope that knows exactly how much real estate to keep between you and him.

I particularly treasure the memory of a late autumn afternoon in Saskatchewan several years ago. Goose hunting was allowed only in the morning, but one evening found me sitting by a small pond hoping a flock of mallards would drop in to spend the night. The mallards didn't come; instead, I was treated to the arrival, a few at a time, of about a hundred honking, cackling, wing-rustling Canada honkers and white-fronted geese. Had it been legal, I would have shot at the first goose and perhaps never witnessed that stirring spectacle. But had I not been hunting, I never would have been sitting by that tiny pond in Saskatchewan in the first place.



Every hunter worthy of the name develops a deep appreciation for all species of wildlife; frankly, I can't imagine what hunting would be like without an interest in the abundant nongame species that inhabit our marshes, forests and grass lands. One of my most vivid recollections of the past hunting season was a day that could be considered a failure if measured by the goal of simply putting meat in the freezer. My Labrador retriever was working a grassy field when suddenly she came to a screeching halt. Ten feet in front of her was a badger—big, flat-bodied, mean looking and not about to give an inch. Hackles raised, my Lab stood frozen—until the badger advanced a few steps in her direction. Then, wisely, she decided discretion was the better part of valor. We retreated a respectable distance and watched the badger throw some dirt in the air and finally disappear into a hole. Score for the day: two Hungarian partridge for the table and one badger for the memory. Something tells me I'll remember the encounter with the badger—a beautiful animal in an ornery sort of way—long after I've forgotten how I bagged the Huns.

Fortunately, wildlife watching is something that can be enjoyed all year; it doesn't have to stop with the end of hunting season. Whether you choose to ski through the heart of the Bob Marshall Wilderness, as did one of our authors in this issue (see page 24), or simply put up a bird feeder in your backyard (see page 11), the opportunities for wildlife viewing in Montana are unlimited. While it's too late this year, you may want to participate in next year's Christmas Bird Count, a tradition which dates back to 1908 in Montana. As Mike Aderhold points out in his article beginning on page 20, the Christmas count provides many hours of enjoyment for those who participate as well as some useful information to aid wildlife biologists in managing bird species. Whatever your preference for winter wildlife viewing, the experiences gained will increase your knowledge of wildlife habits and deepen your sensitivity to the value of all living things. And if you're a hunter, it will make your days afield next fall all the more meaningful and rewarding.—*Dave Books*

Powder River: Historical Underdog

by Bruce Rehwinkel

TO MANY MONTANANS, the Powder River is an unimportant, obscure waterway hidden in the eastern Montana sagebrush. However, certain events along the Powder have been dramatic moments in Montana's history. According to J. W. Vaughn, who wrote "The Reynolds Campaign on Powder River," the underrated and misunderstood Reynolds Battle of the 1876 Indian campaigns assumes new importance. One of Col. Joseph J. Reynolds' scouts misidentified a Cheyenne camp near present-day Moorhead as belonging to Crazy Horse and his Sioux warriors. Although the ensuing battle itself was indecisive, some historians believe this unprovoked attack was the catalyst which unified the usually peaceful Cheyenne with the Sioux. This unification made a mark in history on a June day in 1876 at the Little Bighorn River when Gen. George A. Custer and his 264 men were annihilated.

The Powder River originates in the Bighorn and Rattlesnake mountains of central Wyoming and flows 375 miles northward to its confluence with the Yellowstone River near Terry, Mont. The first stretch of the Powder River Valley, south of Broadus, is narrow with picturesque cliffs, pine-covered hills and a meandering river channel bordered by cottonwoods. The second stretch, north of Broadus to the confluence with the Yellowstone, consists of a wider valley and floodplain surrounded by nonforested "gumbo" hills and a river channel lined intermittently with cottonwood groves.

The Powder River carries large quantities of sediment because of the river's substrate (bottom materials) and surrounding drainage basin. The expression, "It's a mile wide, an inch deep, too thick to drink and too thin to plow," aptly describes the Powder. The flow of the river is erratic, varying from extremes of thousands of cubic feet per second to periods of no flow. Development of pools in the river channel is limited by unstable bottom materials, and the constantly turbid water severely restricts light penetration and minimizes plant growth so little food for aquatic organisms exists. Historical flow records indicate the Powder contributes only 5% of the Yellowstone's annual flow but approximately 50% of its sediment.

Montanans are asking a perplexing question about the Powder: Why is the Department of Fish and Game studying such a river when Montana has other scenic and more productive streams that could be studied?

One of the reasons is because of its location (see map). It meanders through the middle of the Powder River Basin Coal Region. Within the Montana portion of this region, approximately 1.4 million acres of coal reserves is economically extractable. Because of the overburden, the coal's heating capability and its chemical constituents, it can't economically compete with coal from the nearby Decker Mine or strip mines near Gillette, Wyo. as an export commodity. But strip mining in the Powder River drainage could become feasible if the coal could be converted locally to electricity or synthetic gas. Both processes require large quantities of water.

Realizing that energy developments were right around the corner, the department in 1975 launched a three-year study, funded by Utah International, to gather baseline information. The company was concerned about the Powder because it was one of the tentative industrial developers in the Moorhead area (adjacent to the Powder River near the Wyoming line).

Before this study, little was known about the Powder River's aquatic resources and its biological and physical contributions to the Yellowstone River. The study has answered many questions about the importance of the Powder River and its aquatic resources. *A fishery does*

The Powder River (left) originates in the Bighorn and Rattlesnake mountains of central Wyoming and flows 375 miles northward to its confluence with the Yellowstone River near Terry, Mont. (F&G photo: Dave Books). Channel catfish make a spawning run up the Powder River each spring, providing a substantial fishery for local recreationists (above). Fish are collected with the aid of electrofishing gear (below), tagged and released to provide information on populations and movements. (F&G photos)

exist in the river. Unlike those in many streams, game fish in the river system are chiefly migrants present only from March-August. During the remainder of the year (low-flow period), the system supports mostly cyprinids (minnows) and young catfish.

As the ice leaves the river in spring, sauger start to migrate from the Yellowstone into the Powder. During spring 1976 and '77, sauger were collected with electrofishing gear, tagged and released so biologists could follow their movements and study the population. Most sauger were sampled near the Powder's confluence with the Yellowstone River, but some were taken as far as 217 miles upstream near the Montana-Wyoming border. The sauger spawning run ends when the mean daily water temperature reaches 59°F.

Shortly after sauger start moving, channel catfish—the Powder's most popular fishery—begin their spawning migration. Catfish supply a fishery as far upstream as Moorhead, but many leave the mainstem Powder near Broadus and run up the Little Powder River. A population estimate in 1977 set the "run" at about 3,150 fish. Catfish average about six pounds, but every year a few are taken that near the 20-pound mark. A voluntary creel census during 1977 showed that more than 600 hours were spent by local fishermen in harvesting over 1,900 pounds of catfish. Researchers have also verified that channel catfish successfully reproduce within the Powder River system and undoubtedly contribute some fish to the Yellowstone River. Tag returns from fishermen suggest these catfish "home" or return to the Powder River annually to spawn.

The last major game fish to migrate annually up the Powder's muddy waters is the shovelnose sturgeon. The spawning run coincides with high spring run-off—the larger the volume of run-off and the longer it lasts, the larger the run of sturgeon and the farther upstream they move. Tag returns show these fish originate from widely separated points on the Yellowstone River, ranging from Forsyth to Sidney. To date, 434 shovelnose sturgeon have been tagged and released. Many of these fish were larger than the state record (12 lbs., 12 ozs.) for this species.

Fish populations for the remainder of the year (August-February) are comprised primarily of nongame fish, with the dominant species the flathead chub. As one might expect, life is rigorous for these nongame species during low water. Water temperatures sometimes exceed 90°F. and, in places, the river literally stops flowing because of irrigation withdrawals. Fish survive only in small, shallow pools. Despite the adverse conditions, 14 species call the Powder River home year around. One of these, the sturgeon chub, is possibly the state's rarest fish and fares well only in turbid prairie streams such as the Powder.

Researchers also conducted aquatic invertebrate or insect sampling. As suspected, the numbers of different species and population densities were low because of poor light penetration and a constantly shifting bottom. Other information from the study was somewhat startling: Some aquatic invertebrates associated with clear mountain streams are quite common in the Powder River, and others have never before been documented in Montana.

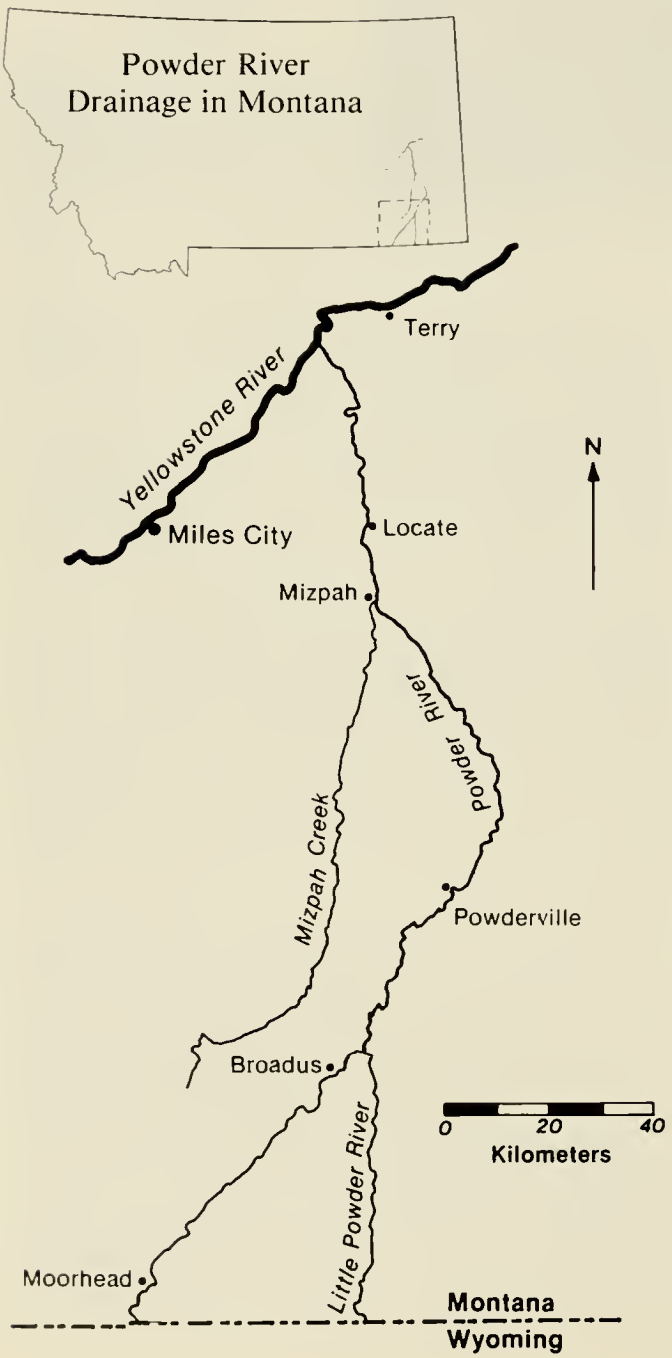
Because several impoundments have been proposed for the Powder River in the Moorhead area and energy developments such as electrical generation and gasification complexes require water, researchers also examined the impact of a mainstem dam on the Powder

FISH IN THE POWDER RIVER

Game fish	Nongame fish
Sauger	Flathead chub
Burbot	Plains minnow
Channel catfish	Silvery minnow
Shovelnose sturgeon	Sturgeon chub
Walleye	Longnose dace
Rainbow trout*	Sand shiner
	Brassy minnow
*Only two have been collected.	Goldeye
	River carpsucker
	Shorthead redhorse
	Stonecat
	Carp
	Green sunfish
	Creek chub

River. A technique recently utilized by the department evaluates how a river changes after it is dammed. With the aid of aerial photographs, researchers measured the river's length, the areas occupied by water, sand and gravel bars, islands and river bottom vegetation. A dam changes a river system because it traps the sediment and results in discharge of clean water. This discharge accelerates the river's erosion capability and eliminates peak spring discharges. Documented studies show that the number and area of islands, total water area, and gravel and sandbar areas are reduced when impoundments are constructed on the mainstem of a stream.

These changes adversely affect both fish and wildlife.



Using other documented studies in Montana, researchers concluded mainstem impoundment on the Powder could cause wildlife habitat loss and possibly induce agricultural land changes that would leave less room for wildlife. In addition to these problems, water loss by evaporation from the reservoir would raise the level of dissolved salts in the river. This could pose severe problems to aquatic life, to say nothing of difficulties to irrigators.

The alternative to such an impoundment is off-stream storage. Such an alternative has good and bad points. On the positive side, years with high water would mean larger quantities of water in the river to maintain the fishery and present channel shape. But withdrawal of water would decrease the river's ability to carry silt. Sediment would be deposited below the pumping site and cause the channel to rise. Flooding could result, along with the choice between the "lesser of two evils"—diking or channelizing—since the river would be higher than the surrounding land.

Either a main stream or off-stream storage impoundment would deprive the Yellowstone River of sediment and alter its energy equilibrium during the spring, probably causing channel changes. In addition, either type of reservoir would produce a short-lived, low-quality fishery because of sediment deposition and large annual drawdown.

The future of the Powder River and the rest of the Yellowstone River Basin was debated during the August-September 1977 Yellowstone River Water Reservation hearings. The Powder generated great interest from industrial concerns. However, during this period of environmental concern and awareness, nominating any region or water course as a national sacrifice area would risk strong public outcry. So, some type of compromise had to be attempted. The department tried to pinpoint the *minimum* amount of water needed to preserve the Powder and asked only for that volume as an instream reservation (47% of the lower river's mean annual discharge). This attempt at compromise was complicated by the 28-year-old Yellowstone River Compact and other water requests which totaled considerably more water than exists in the Powder for an "average" year. (Final action on the flow reservations for the Yellowstone and Powder rivers are to be finalized by the Board of Natural Resources and Conservation after this issue has gone to press.)

When considering the information collected, projects like this one certainly seem worth the effort. The Powder River is a self-sustaining resource and it is the department's job to protect such resources. If degradation of fish and wildlife habitat is to be minimized, preventive measures such as this project are worth infinitely more than cures applied later.

More important than the resource described here is how Montanans react to this situation. If the Powder is protected, it will mark a continuation of a valued way of life. If the Powder is sacrificed to appease our nation's energy appetite, this sacrifice won't be the last. As with the Reynolds Battle, the Powder River has been accidentally given the position of serving as a pivotal point in Montana history. ■

F&G photo: Mike Aderhold

The Pincushion That Waddles

by Ken Walcheck

IT WAS ABOUT 4:30 in the morning when I abruptly sat up in my cot and remembered a statement made by the legendary Leroy R. "Satchel" Paige during his heyday as a major league pitcher back in the mid-1950s. As the story goes, Paige walked the first batter; before delivering his next pitch, he turned, pointed to the runner on first and said, "There you is, and there you stays!" He then proceeded to strike out the next three batters.

What stirred my memory at this early hour was a chomping sound which sent vibrations up the wooden leg of my camp cot. Switching my flashlight on, I was greeted by a pair of black, beady eyes and a portly body encased in

a bundle of quills. Well, there he was, and there I stayed. A half hour or so of exasperation followed as I tried to prod the waddling pincushion out of the tent.

When Theodore Roosevelt proclaimed that the United States should "Speak softly and carry a big stick . . . ," he might have been describing the porcupine. If ever an animal served as an example of how to live in peace by being perpetually prepared for massive retaliation, it is the porcupine.

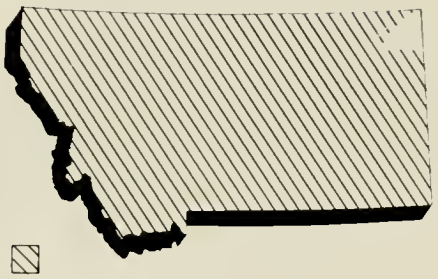
Although several species of porcupines exist in the world, only one, *Erethizon dorsatum* (meaning "irritable back"), lives in North America. It ranges from the northeastern coastal states, through the Great Lakes states, into the western states and north to Canada and Alaska. Only the southeastern and central states lack porcupines.

The porcupine has ranged over various landscapes for more than a million years. He has roamed the forests, along with the saber-toothed tigers and elephantlike mammoths and mastodons. While these larger and more aggressive animals have become extinct, the porcupine has survived.

A porcupine's armor consists of some 30,000 multibarbed quills strategically located on the head, back, flanks and tail. They are absent only on the face, legs, belly and underside of the tail.

A porcupine's needle-sharp quills are sometimes five inches long. Contrary to some popular beliefs, the quills are not venomous, nor can they be "shot." Because of the reverse barbs and the inevitable muscular contractions of the victim, quills are difficult to remove and tend to work their way deeper into the body. For the wild animal badly impaled in the facial region, death is inevitable because the animal can't eat. Aside from man, only the fisher and mountain lion have much success in attacking the porcupine. Other predators—the great horned owl, lynx, bobcat and wolverine—occasionally do him in, but often pay dearly for their brashness.

When danger confronts the heavy-bodied bearer of minispears, he lowers his head, braces his legs and pivots, presenting an armored back and tail. If the attacker pursues, it can expect to receive an excruciatingly painful "shower" of quills from a thrashing tail.



Distribution of the porcupine in Montana

The danger from that flailing tail can't be overemphasized. While attending a wildlife short course at a biological field station one summer, I watched a couple of students with brooms maneuver a large, yellow-haired porky into a galvanized garbage can. Realizing he had backed into trouble, the porcupine erected his black-tipped quills and chattered his teeth in mock ferocity. When he tried to waddle out of the can, the brooms blocked his way and pushed against his unprotected muzzle. He reversed directions, bumped the rim of the can and his tail automatically slapped in defense. It is easy to see how the erroneous notion that porcupines "shoot" their quills started, because the tail made a blurred arc, struck the metal and the loosely attached quills flew in all directions.

As many sportsmen will readily testify, hunting dogs sometimes suffer after muzzling the prickly creature. Home remedies are many, but few, if any, work. Because of the reverse barbs, the quills offer such stubborn resistance that the most humane action is a quick trip to the nearest veterinarian. If this is not possible, a quick jerk with a pair of pliers works best.

Porcupines are equipped with four wood-chiseling incisors. There is practically no type of plant—from trees to dandelions—which they can't chop up and grind with their beaverlike teeth. Porcupines are quite adept at chipping off a tree's outer bark and feeding on the inner cambium layer. The bark from willow, pine and aspen provides suitable winter forage. Their preference for wood, however, has caused some foresters to label them "pests" and blame them for killing and scarring trees.

Because of his "salty tooth," a porcupine will gnaw on items saturated with perspiration. In fact, anything impregnated with salt is considered prime nibbling material—from ax handles to toilet seats.

Active all year, porcupines are commonly afield at night. During the day, they hide in rock crevices, thickets or hollow logs. In coniferous forests, porcupines prefer a "rest tree" instead of a den. As clumsy as a climbing porcupine may first appear, he is very much at home in trees. With hooked claws, tubercle-studded soles and a stumpy tail which braces him, he can match any lumberjack in climbing. What the porcupine lacks in speed, he makes up for in tenacity.

The porcupine's mating ritual would have to be rated a classic. Despite the fact that porcupines are essentially loners for most of the year, they always manage to get together during the fall mating season. Through a combination of high-pitched calls and urine scents, the two sexes finally meet. When they do, they engage in erotic courtship displays which include muzzling, squealing and teeth chattering. Occasionally, the male urinates on his partner. When the female is receptive, she controls her quills, arches her tail and carefully holds this position as the male cautiously approaches.

The gestation period lasts about seven months and females usually bear a single porcupette covered with soft, wet quills that quickly dry and harden. In less than an hour, the porcupette is armed for defense.

Despite the fact that some consider the porcupine no more than a dull-witted "mammalian slug" and a seemingly "useless prehistoric offshoot," it contributes to the diversity of our wildlife community. Its value is enhanced when it is recognized and appreciated as an example of a thing natural, wild and free. ■

The Catchall

MO Interviews New Wildlife Administrator

• *Gene Allen, former chief of the department's Wildlife Research Bureau in Bozeman, has been named administrator of the Wildlife Division. He succeeds Wynn Freeman, who died in early September. Allen has held the research post since 1973; from 1970-73, he was a research biologist working on the Interagency Cooperative Elk/Logging Study; from 1967-70, he worked as a game management biologist for the department in Bozeman, concentrating on the Gallatin elk study; from 1965-67, he was a game management biologist in Dillon, and from 1964-65, he worked on a department white-tailed deer study in the Missouri Breaks. He holds a B.S. degree in biology from Jamestown College in Jamestown, N.D., and an M.S. in wildlife management from Montana State University, Bozeman.* Montana Outdoors *recently interviewed him about some of his views on the future of the state's wildlife program.* —Ed.

* * * * *

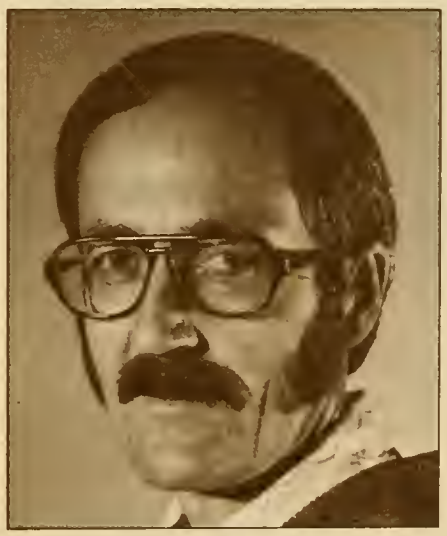
Montana Outdoors: Wildlife is an important part of Montana's heritage. What is the future of wildlife in Montana?

Gene Allen: We will always have wildlife. The questions are where, what kinds and in what densities. The primary thing we must keep in mind is that wildlife is a product of the land. Wild animals are completely and totally dependent upon their habitat—the land—for survival. What happens to the land will determine very directly and quickly the answers to the questions of how many, where and what kinds of wildlife we will have. Nearly everything we do affects some wildlife species. Some activities affect some species positively; many others affect other species adversely.

MO: What are some examples of activities that affect wildlife?

Allen: The impacts of some activities are severe and direct. For example, the abrupt land use change of converting sagebrush or native grass land to wheat is a very drastic turning over and elimination of a type of habitat supporting a certain variety and number of animals. There is no way the same numbers and kinds of animals will exist on that piece of land after that sort of an abrupt and total habitat change has occurred. Clearcut logging is another example of an activity which completely alters the landscape, including the habitat for many wildlife species. Livestock grazing, weed control and rural subdivisions are still other examples of activities which can directly and significantly impact wildlife habitat.

Don't misunderstand me—I'm not saying these land uses and practices are necessarily bad or undesirable. Many of them are necessary and inevitable products of changes in the national economic picture. Wheat and cattle prices go up and down; interest rates and housing starts vary, influencing the demand for wood; all of these can directly influence the decisions of land managers in Montana. I am simply saying that many of these activities can adversely affect wildlife. Neither am I implying that wheat fields and clearcuts will be devoid of wildlife, just that wildlife species composition and densities will be different afterward.



Gene Allen

Other influences are more indirect. These mostly involve increased human activities and the adverse impact they can have on animals. The strip mining of coal is a good example. Many acres are turned upside down in the extraction process and probably won't support the same numbers or kinds of wildlife as before. But perhaps an even greater impact on the wildlife resource is the necessary activities of people associated with strip mining—new roads, rail spurs, new towns, etc. The crunch of more people will simply aggravate an already serious problem of too many hunters in an area of mostly private land. Not only is wildlife affected, but it also creates new and unique management problems that must be dealt with if we are to maintain optimum recreation opportunities.

While oil and gas exploration leaves few permanent scars on the landscape, the process does involve activities of people. When exploration is going to occur in an area of critical, seasonal importance to animals, the activity should be scheduled during the "off season" when it will be the least disturbing.

In short, there is increased demand for a resource produced on a finite or shrinking land base; at the same time, the demand for competing uses is also increasing. The only thing we can be sure of is that change will be an inevitable part of the future. The key to maintaining wildlife numbers and managing them for man's enjoyment is to remain flexible. We must be able to respond to these new problems in new and creative ways.

MO: You mentioned man's enjoyment of the wildlife resource. What problems do you see there?

Allen: Regardless of how many and what kinds of wildlife we have, if people don't have access—for hunting or nonhunting purposes—utilization or enjoyment of the resource is difficult, if not impossible. In eastern Montana particularly, access to private land is one of our biggest problems. We have taken measures through our Landowner Relations/Sportsmen Access Advisory Council, an *ex officio* law enforcement officer training program and in other ways to help private landowners. They face real problems in simply dealing with the increased numbers of hunters on their land. We hope to help them resolve these problems and improve access.

Access is just one of many new kinds of challenges we face in Montana as a result of increased demands for a limited resource. And we can expect the ratio of supply to demand to worsen in the future.

MO: How do you view the role of the department's Wildlife Division in

recycled paper

Montana's wildlife management program?

Allen: First, we must continue to monitor population levels and trends of the various wildlife species. For game animals, we must have an idea of the hunting harvest potential; at the same time, we must maintain a base population that will provide us with an annual huntable surplus.

The interest in nongame wildlife has increased dramatically in the last several years. In the past, most nongame benefits were coincidental by-products of our game management program—if the habitat requirements of our most demanding big game animals could be satisfied, the needs of many nongame species would be met as well. While this is still true, we now have a program dealing specifically with nongame wildlife. I expect the effort expended on nongame to gradually increase in the future, especially as new funding sources are found permitting nonhunters to support part of the cost of this program.

Another important aspect of our work is to identify threats that would adversely affect wildlife habitat. When we recognize these threats, we believe, under the law, that it is our responsibility to draw attention to them and to work with the causative factors and resolve the problems.

Since much of Montana is public land, a very important aspect of our job is to maintain close liaison with public land managers to ensure that wildlife needs are included in the planning and management of public land.

In summary, I see the responsibility of the Wildlife Division as continuing to monitor and determine the needs of the wildlife resource and trying to maintain a quality habitat that will support productive wildlife populations. I think we also must make a better assessment of the desires of sportsmen, at the same time informing them as to what the alternatives are with the resources with which we have to work. Somehow, we must develop a program that combines the needs of the resource and the desires of the sportsmen with one that is compatible with the landowners' goals for the lands upon which the wildlife resource resides. If we can do this, we will continue to have an equitable distribution of wildlife for Montanans to enjoy.

To the Moon and Back—Four Times

Jim Stradley

Jim Stradley has flown enough miles to equal about 3,600 trips across Montana, or 740 trips across the United States, or 80 times around the earth—or about four trips to the moon and back. That's not bad for a fellow in a lightweight Piper Cub.

Jim and his sons David and Roger own and operate Gallatin Flying Service in Belgrade and estimate about 90% of their work is involved with wildlife management surveys. When you consider that each of them flies 150-200 times per year and they average about 500 sightings of individual game animals per flight, each of the Stradleys sees 75,000-100,000 game animals every year. Most of their survey work is for the Department of Fish and Game, National Park Service or the U.S. Fish and Wildlife Service.

Representatives from these groups, Montana State University and other business associates and friends honored Jim and his wife Margaret at a dinner last spring. The group gathered in appreciation of Jim's long service to and interest in wildlife management and research. As master of ceremonies Terry Lonner, a research biologist at Fish and Game's Wildlife Research Bureau in Bozeman noted, "Most banquets of this nature are centered on a man's retirement, but since Jim is far from that, this event is nothing more than a big pat on the back for a job well done and acknowledgment that we're looking forward to several more years of his captainship over the Gallatin Flying Service."

From purchase in 1938 of his first plane—a Taylor craft with a 40-horsepower engine that would do about 90 miles per hour, depending on the load—Jim went on to teach civilians how to become World War II fighter pilots. He joined Lynch Flying Service in Belgrade after the war and became Montana's first licensed crop duster. In 1950, he earned the distinction of being the first newsboy to deliver papers to remote ranches via airplane. While Jim was dropping off copies of the Bozeman Chronicle, the Sunday edition landed on the roof of a subscriber who lived east of Manhattan. As soon as Jim saw the predicament, he circled the house again and landed the paper six feet from the kitchen door. He continued his work with Lynch, which included some game surveys for the Department of Fish and Game, until he purchased Gallatin Flying Service later that year (1950).

His work for the Department of Fish and Game has included tracking animals equipped with radio transmitters via antennae connected to his plane. The information gathered helps biologists determine the migration habits of such animals as grizzly bear, moose, deer, elk and osprey. There are few animals he hasn't worked with during the many wildlife surveys he's participated in over the years. As Jim said in an interview in the Bozeman Chronicle, "The only ones we haven't worked on would be coyotes and rattlesnakes."

But who knows—for someone who has flown a light plane the distance to the moon and back four times, anything is possible.

Was A Wolf Killed In Valley County?

The answer to this question began to cause speculation in the department's regional headquarters in Glasgow on Oct. 12, 1978, when Ed Bond of Hinsdale brought in a dead animal that appeared to be a wolf. Bond, a stockman, found the animal in north central Valley County in the Buggy Creek drainage, about 24 miles north and slightly west of Glasgow.

Mike Aderhold, the department's information officer in Glasgow and a biologist, examined and autopsied the animal. He said he was "90% sure the animal was a wolf." He noted that wolves are now extremely rare in Montana, and this was the first free-roaming wolf he had seen. Aderhold said he had observed wolves in several zoos and had looked at and photographed wolf skulls in the National Museum. He said books describing wolf characteristics emphasize the following: large size; very large teeth in relation to skull size; a large, broad skull, and large feet in relation to the animal's size.

To positively identify the animal, Aderhold sent the skull to the department's Wildlife Research Bureau Laboratory in Bozeman. Biologists there will clean it and take fine measurements; then, they will probably send the skull to the Smithsonian Institution in Washington, D.C. for comparison with other wolf skulls from Montana.

As Aderhold emphasized, wolf identification is difficult and even experts have trouble agreeing about some of the subtle characteristics. Tom Nelson, deputy sheriff in Hinsdale who has had experience with Alaskan wolves, and Wes Scott, federal animal damage control agent in Glasgow, both agreed that the animal Bond found appeared to be a wolf. However, Philip Wright, professor of mammalogy at the University of Montana in Missoula, who has not yet seen the skull, warned that nine of 10 reported wolves turn out to be wild dogs.

The animal was a young female weighing 83 pounds. She measured 68½ inches from the nose to the end of the tail, had an 18-inch neck, a 33-inch chest and a paw 2¾ inches wide at rest. The fur was black to charcoal grey with white flecks. Aderhold reported the animal was shot once, high in the hind quarter, possibly three to five days before it was found. He took fur samples, but because the fur and flesh were separating badly, he made no attempt to salvage the hide. The skull and food tract were frozen and sent to Bozeman, but the reproductive tract had been destroyed by decay and shot. Aderhold reported the stomach was empty, except for a tablespoon of digested material. The mammary (breast) tissue indicated no sign of recent milk production.

According to department files, the last confirmation of a wolf in northeastern Montana was in May 1956. The animal was shot by Ed Tihista and Leo DeBray in the Tomato Can Creek drainage about 17 miles northeast of Nashua. This animal was checked by Tom Hay, then the department's supervisor for the Glasgow region, and Dick Trueblood, wildlife manager for the Glasgow region. The skull was examined by the Smithsonian Institution and is now in Fish and Game's skull collection at the Bozeman lab.

Aderhold said the Glasgow Fish and Game office receives from four to six calls about wolf sightings per year. In most cases, they are impossible to confirm or deny. Aderhold believes the wolf, whooping crane, mountain lion, black bear and moose are all very rare visitors to the northeastern corner of the state, with the wolf the rarest of the five.

All species of the gray wolf *(Canis lupus)* have been classified as endangered in Montana and shooting them is against the law.

Aderhold noted two other unusual sightings occurred in the northeastern corner of the state in 1978. On June 22, Larry Calvert and Jim McCollum, U.S. Fish and Wildlife Service managers,

Ed Bond, Hinsdale, with an animal believed to be a wolf found in the Buggy Creek drainage about 24 miles north of Glasgow. The last confirmed wolf sighting in northeastern Montana was in 1956. (F&G photo: Mike Aderhold)

observed and photographed a black bear on the UL Bend National Wildlife Refuge in south Phillips County. On Sept. 8, the opening of bird season, former Fish and Game Director Don Brown and Glasgow Regional Supervisor Dick Johnson approached to within 30 yards of a medium-sized bull moose immediately south of the Fort Peck spillway in McCone County. Both black bear and moose have been rare in this part of the state since the late 1800s, Aderhold said.

* * * * *

• Montana Outdoors *will update the wolf story in a later issue.*—Ed.

"In the Hands of Man" Wins International Award

The Department of Fish and Game's newest movie, "In the Hands of Man," has recently received the Silver Award at the International Film and Television Festival of New York. The film was entered in the educational documentary category. The 45-minute documentary details the life style of the mule and white-tailed deer in Montana and the biological characteristics of the two species.

The film underscores the need for wise resource management which will maintain the habitat necessary for healthy deer populations.

With assistance from other department employees, "In the Hands of Man" was written, directed, photographed and edited by Craig Sharpe, motion picture production manager for the department's Conservation Education Bureau. He noted the movie was filmed entirely in Montana. It is available, free, from the department's Film Center in Helena or from regional offices.

Shorter Version Of Plan Available

"Design for Tomorrow" is an abbreviated, simplified, updated version of the "1978 Montana Statewide Comprehensive Outdoor Recreation Plan." In it, the Department of Fish and Game presents the goals, objectives, major problems, responsibilities and actions for its three resource programs: wildlife, fish and parks.

As Director Robert F. Wambach writes in the "Foreword," "We hope it will tell you where *we* think we should be going. But we also hope it will stimulate some debate and that you will give us the benefit of your thinking. . . .

"The protection and enhancement of Montana's fish, wildlife and other recreation resources is a big job. We need your help, and we would appreciate your participation in this planning effort." The plan is ongoing and will be continuously updated.

To ensure opinions and comments from a broad segment of the public, the publication is available, free, from all regional department offices, at the Helena headquarters or by writing the Department of Fish and Game, 1420 E. Sixth Ave.; Helena, MT 59601.

Book Reviews

THE COMPLETE FISHERMAN'S CATALOG, by Harmon Henkin, J. B. Lippincott Co., Philadelphia/New York, 1977, 463 pages, $7.95, paper.

This is a book you would hardly expect to find. As implied by the title, it is a catalog and, as Harmon Henkin says in the Introduction, ". . . Though we certainly don't have every bit of quality equipment listed in the thousand or so commodities in the book, every one we list should be of real value to the angler. . . ."

Henkin continues, ". . . There are few sources that compare gear with other similar products. We don't have anything to sell in the 'Catalog.' Like other anglers we are consumers of tackle and want the most for our money. Whether you are after high-quality dry flies or a medium-range close-faced spinning reel, this book can help you wend through the maze of those offerings and make some sense of them."

Then, too, there are ". . . original contributions by some of the better known angling writers in the country and the compilation of excerpts from the rich literary heritage of fishing." As Henkin says, ". . . They aren't the last words on the subject but good first ones at least."

A sampling of chapter headings gives an idea of the book's tone:

• Graphite is Here to Stay—Although there's no such thing as the perfect fly rod, graphite rods are the best casting tools ever made.

• Fly Fishing Reels—They're not just places to store your line.

• Fly Tackle for Western Fishing

• How to Buy a Fresh-water Spinning Reel—The cheapest and most expensive reels are not the worst and the best.

• Spinning Rods—Stick with established brands and avoid gimmicks.

• Lure Lovers Rise Through Three Stages.

This is a reference book and not necessarily a book to be read page by page. It is an excellent book for the beginner or for the experienced fisherman who wants to be knowledgeable about his sport. The format is striking; it has the appeal of an old-fashioned Montgomery Ward or Sears catalog.

Henkin is a free-lance writer who lives in Missoula. He was formerly an outdoor writer for the Missoulian and wrote three books before "The Complete Fisherman's Catalog."—*George Holton, assistant administrator, Fisheries Division*

THE CONTROVERSIAL COYOTE: PREDATION, POLITICS AND ECOLOGY, by Laurence Pringle; Harcourt, Brace, Jovanovich, Inc., New York, 1977, 87 pages, $5.95.

The role of predators, particularly the coyote, is perhaps the most misunderstood and controversial wildlife subject in the United States. Is the coyote an indiscriminate and wasteful killer of livestock or is it an invaluable natural predator?

The controversy over the coyote has been going on for many decades. The public has come to know two basic arguments: the view of sheepmen, who advocate strict control, and the view of environmentalists, who feel the coyote is an important part of the ecosystem. Strong emotions have risen on both sides, but few people have been able to see the middle ground.

In his latest book, Laurence Pringle takes an objective look at the predator controversy. With 35 interesting black and white photographs, the book begins by giving a life history of the predator and the American view of its role. The reader then gets to know the coyote, its habits and biology. From there, Pringle takes a look at the problems of coyote control and how biologists are working on an alternative to the poison 1080.

In his discussions, Pringle repeatedly admits, "Yes, coyotes do kill sheep." (One chapter even has this title.) But he also believes coyotes play a role in the natural world and that many sheepmen have not attempted to try new methods of herd protection.

Pringle considers both sides, and of all the material I've read on coyotes, "The Controversial Coyote" is probably the most sincere and balanced treatment of the subject.—*Craig Sharpe, motion picture production manager*

Winter Fare For Feathered Friends

by Ron Paulick

Anyone can feed birds in winter. The method can be as simple as throwing stale bread on the ground or as elaborate as maintaining five or six different kinds of feeding stations. Whatever the approach, you can derive much enjoyment from feeding and watching birds—enjoyment that need not stop as winter ends, since birds are around all year. The ability to identify the winter and summer songs of birds and to recognize them in both their dull winter and bright summer colors makes birding a challenging adventure.

This article is only a guide to bird feeding in winter; your local library can supply more information. Many excellent books containing a variety of information on attracting and feeding birds are available (see "Additional Reading").

Depending on the types of food, the amount and kinds of available cover and your location, winter feeding stations may attract 40 or

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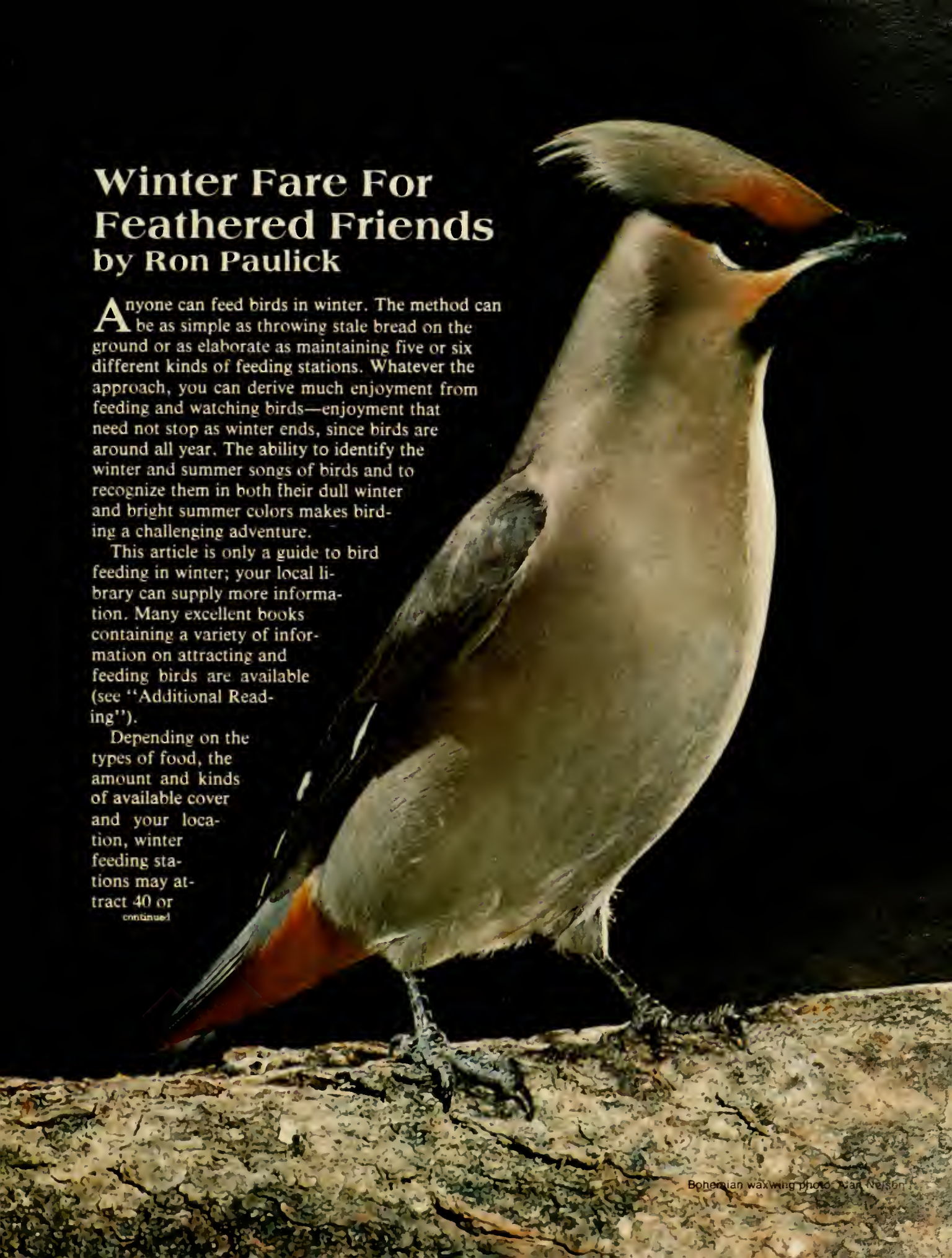


Bohemian waxwing photo: Alan Nelson

more bird species. Of course, not all of these species will be present simultaneously. Some will be spring or fall migrants, stopping for a few days and then moving on. Others will be strays, wandering far from their normal ranges. Still others will be regular visitors.

Attracting these visitors is rewarding, but being able to identify them is even more so. This takes skill and experience, but you will have a good start if you answer these questions about the birds at your feeders:

- How large is the bird? How does it compare with the size of a bird you already know—a robin, house sparrow or starling?
- What shape is the bird? Is it slender or stout? Is its tail long, short or stubby? What does the bill look like? Is it long and narrow, short and thick, needlelike, curved downward or slightly upward?
- What color is the bird? Is it all one color or different colors? If multicolored, where are the colors? Are they bright or dull?
- Are there any distinguishing marks on the bird? Are there white bars across the wing, a tuft of feathers on top of the head, streaks on the breast, stripes above the eyes?
- How does the bird fly? Is its flight quick and erratic, slow and direct or undulating?
- Does the bird possess any peculiar mannerisms? How does it approach your feeder, search for food, eat, bathe, perch?
- What kind of song does the bird have? Have you heard it before?

The answers to these questions take some effort, but with the aid of an informative guide (see "Additional Reading"), 7x35 binoculars and records of songs and calls, anyone can do it. A partial list of the species you might see at your winter feeders, along with some other useful information, is provided in Table 1.

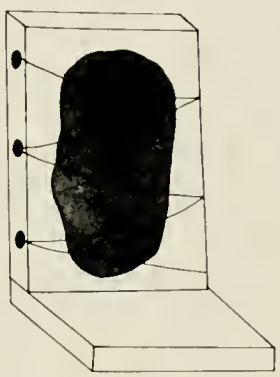
One way to identify these and other species is to frequently thumb through your field guide, testing yourself to see if you can correctly name a particular bird. It also helps to become familiar with bird distribution maps and the brief descriptions for each species. To help you get started, I'll describe two birds you might see.

The small bird with a black crown and bib, grey back and white cheeks often seen searching for dormant insects by hanging upside down from pine branches or jumping about in the tangles of a shrub is the black-capped chickadee. As it darts about, it will greet you by calling its own name—"chick-a-dee-dee-dee." At your feeder it often selects sunflower seeds, although it will take other types of food. Taking a seed to a nearby limb, the chickadee will place the seed between its toes and crack it open with its bill. The chickadee's acrobatic movements enable it to use relatively hard-to-negotiate feeders, like the satellite seed feeder or the suet bag (see illustrations). From three to 10 chickadees may descend on your feeders, seemingly coming from nowhere.

If you have visitors that seem to devour all your sunflower seeds in one meal, your guests may be evening grosbeaks. They are large birds with massive, parrotlike beaks and contrasting yellow, black and white markings.

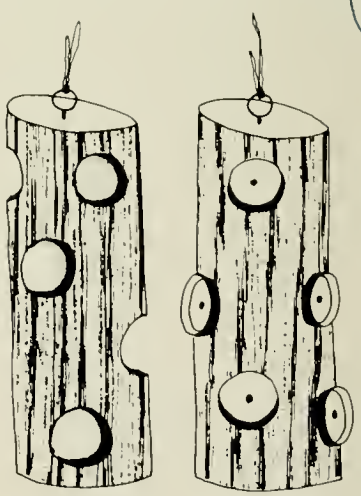
Suet Feeders

SUET BOARD
(homemade)
The backboard is four inches wide, six inches long and one-half to one inch thick. The baseboard is four inches wide, three inches long and one-half to one inch thick. String (attached with tacks) holds a slab of suet in place. Or, you can use one-half-inch wire mesh.



PINE CONE SUET
(homemade)
A pine cone is dipped into cooled suet or cooled suet can be repeatedly dripped onto the pine cone.

SUET BAG
(homemade)
A small onion or orange sack works well. Prepared bulk suet is placed in bag.



SUET LOGS
(homemade)
The logs are three to four inches in diameter and from nine to 16 inches long. The suet mixture is placed in quarter-sized holes drilled one inch deep. Bottle caps can be nailed to the log if holes cannot be drilled.

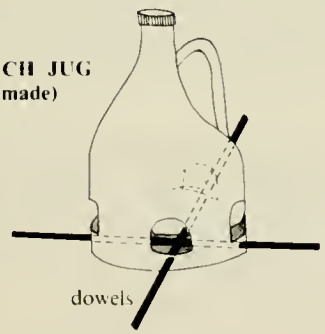
The male's coloring is more vivid than the female's. An interesting aspect of this species' behavior is its constant movement from one feeding station to another. So, if these birds are not at your feeder, they are probably raiding your neighbor's.

Two other visitors to winter bird feeders include the house sparrow and starling. In fact, they will probably be your first visitors. Their sheer numbers and aggressiveness will create some problems, but in the long run you may benefit by their presence. This is especially true of the house sparrow. Through its constant chattering, this species advertises your feeders, thus helping to attract other birds.

FEED AND FEEDERS

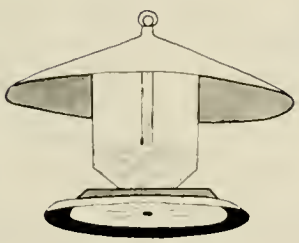
The menu you offer is the key to feeding birds; a greater selection of food results in a greater variety of species. Your feeding program should start early, after the first or second cold snap. In Montana, that may mean September or early October. The reason for starting early is that birds establish a winter feeding territory, usually in early autumn; if your feeders are included in this territory, the birds will repeatedly visit.

Hanging Seed Feeders

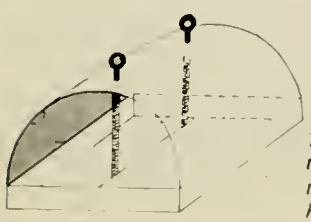


BLEACH JUG
(homemade)

HANGING COCONUT HALF-SHELL FEEDER
(homemade)



LANTERN FEEDER
(bought commercially)



DOME TRAY FEEDER
(homemade)

The tray is made of wood, while the dome is constructed of plastic or thin sheet metal. It can be hung with two large eye bolts.

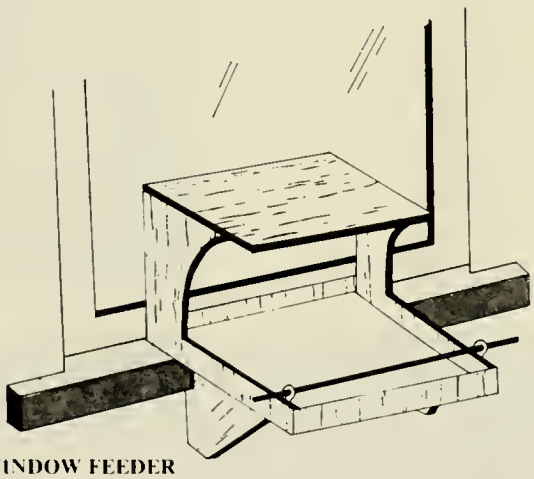
A bird's most important winter activity is finding enough food to stay alive, so make sure your feeders are always full. Don't begin a feeding program if you can't maintain it all winter. Some birds may become dependent on your feeders, and could be endangered if their food supply is suddenly removed during cold weather.

Birds have definite eating schedules. They usually eat from one to two hours after sunrise and before sunset, with moderate but continual feeding in between. The energy demands of a cold night necessitate this feeding schedule.

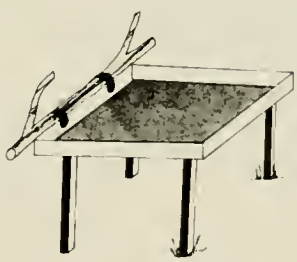
The diet of different bird species can best be satisfied by providing seeds, suet or suet mixtures, fruit, nutmeats and bakery products (see Table 2). These items are rich in carbohydrates, fats and sugars, which help satisfy a bird's energy needs in cold weather.

Most bird seed packages contain small seeds, such as

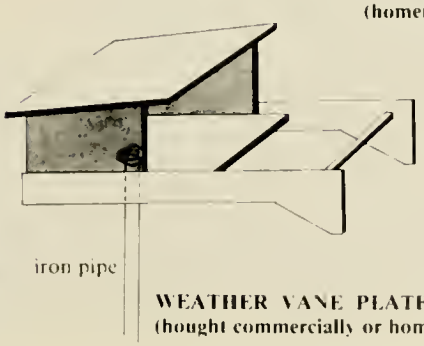
Stationary Seed Feeders



WINDOW FEEDER
(homemade)



GROUND TRAY FEEDER
(homemade)



WEATHER VANE PLATFORM FEEDER
(bought commercially or homemade)

Cassin's finch photo: Alan Nelson

Evening grosbeak photo: Dean Biggins

Table 1
Birds You Might See at Your Feeder

(Boldface letters indicate first winter food choice or frequent feeder use during the four seasons. A lighter type indicates second choice or less frequent seasonal use. F = Fall, W = Winter, S = Spring and SM = Summer)

	Bird species	Food	Season
(1)	Rock dove (domestic pigeon)	**seed, fruit**	**F, W, S,** SM
(2)	Common flicker	**suet,** fruit	**F, W, S,** SM
(3)	Yellow-bellied sapsucker	**suet,** fruit	F, S, SM
(4)	Hairy woodpecker	**suet,** fruit	F, W, S, SM
(5)	Downy woodpecker	**suet,** fruit	**F, W, S,** SM
(6)	Gray jay	**seed,** fruit	F, W, S, SM
(7)	Blue jay	**seed,** fruit	F, W, S, SM
(8)	Steller's jay	**seed,** fruit	**F, W, S,** SM
(9)	Black-billed magpie	**seed, suet, fruit**	F, W, S, SM
(10)	Clark's nutcracker	**seed, suet,** fruit	**F, W, S,** SM
(11)	Black-capped chickadee	**seed, suet,** fruit	**F, W, S,** SM
(12)	Mountain chickadee	**seed, suet,** fruit	**F, W, S,** SM
(13)	White-breasted nuthatch	**seed, suet**	**F, W, S,** SM
(14)	Red-breasted nuthatch	**seed, suet**	F, W, S, SM
(15)	Pygmy nuthatch	**seed, suet**	F, W, S, SM
(16)	Brown creeper	**suet**	F, W, S, SM
(17)	American robin	**fruit**	F, W, S, SM
(18)	Bohemian waxwing	**fruit**	**F, W, S,** SM
(19)	Cedar waxwing	**fruit**	F, W, S, SM
(20)	Starling	**seed, suet, fruit**	**F, W, S, SM**
(21)	House sparrow	**seed, suet, fruit**	**F, W, S, SM**
(22)	Red-winged blackbird	**seed, suet**	F, W, S, SM
(23)	Evening grosbeak	**seed,** fruit	**F, W, S,** SM
(24)	Purple finch	**seed,** fruit	F, W, S, SM
(25)	Cassin's finch	**seed,** fruit	F, **W,** S, SM
(26)	House finch	**seed,** fruit	F, **W,** S
(27)	Pine grosbeak	**seed,** fruit	F, **W,** S, SM
(28)	Gray-crowned rosy finch	**seed,** fruit	F, W, S, SM
(29)	Hoary redpoll	**seed**	F, W, S
(30)	Common redpoll	**seed**	F, W, S
(31)	Pine siskin	**seed**	F, W, S, SM
(32)	Red crossbill	**seed**	F, W, S, SM
(33)	Dark-eyed junco	**seed**	**F, W, S,** SM
(34)	Tree sparrow	**seed**	**F, W, S**
(35)	Harris' sparrow	**seed**	F, W, S
(36)	White-throated sparrow	**seed**	F, S
(37)	Song sparrow	**seed**	**F, W, S,** SM

millet, milo, cracked corn and canary seeds, but there are also some larger seeds like sunflower seeds, soybeans, oats and whole corn. Sunflower seeds are preferred by larger birds, such as jays and grosbeaks, and by a number of smaller birds such as finches, chickadees and nuthatches.

When purchasing bird food, buy in bulk; amounts ranging from 50-100 pounds are most economical. Also, when possible, buy the different types of seeds separately. It is better to experiment with your own menu than to rely on prepackaged foods. Your own menu will better fit the needs of the birds in your area, and you can vary it whenever you wish.

Suet is the hard fat around the kidneys and loins in beef and mutton that yields tallow. When cut in strips and put through a meat grinder, beef suet makes a much better bird food than mutton suet. Suet yields energy and is accepted by both insect- and seed-eating birds. If suet is unavailable, other fats such as shortening or roast drippings can be used (see Table 2).

Suet mixtures also yield energy and provide other nutrients, proteins and minerals. Birds seem to like these mixtures. Several recipes are provided in Table 3.

Fruit, nutmeats and bakery products can also be offered. Fruit is not too popular with most winter birds, but birds less often seen in winter, such as robins and waxwings, may visit your feeders if you provide some fruit. Unsalted nutmeats, although expensive, are also food for winter birds. Woodpeckers, jays or nuthatches will eat chopped nutmeats. Although peanuts are the least expensive, they are also the least desirable; however,

Table 2
What to Feed Birds

Seeds—small seeds: millet, canary seed, milo, cracked corn, hemp, rape, rice, chick feed

large seeds: whole corn, sunflower seeds, oats, wheat, buckwheat, soybeans, pumpkin seeds, squash seeds

Suet—beef fat or shortening, lard, roast drippings, bacon drippings

Suet mixtures—made by stirring into a water-suet base any one or a number of the following: cornmeal, peanut butter, rolled oats, egg shells, raisins, nutmeats, bread crumbs, seeds (See recipes in Table 3.)

Fruit—chopped or sliced apples, oranges or pears; grapes, raisins, cherries, bananas; dried figs or apricots

Nutmeats—chopped peanuts, pecans, walnuts or coconut (unshredded)

Bakery products—pieces of doughnuts, stale bread, cornbread, dry cereal, popcorn, cracker crumbs, old biscuits, cakes or muffins

when unshelled peanuts are strung on a string, chickadees will make an all-out effort to get to the nuts.

There are probably 101 different types of bird feeders you can make or buy (see illustrations). Many of these can be made at home with simple tools.

The ground is a good place to start your feeding program. Stale white bread is an excellent lure. When birds begin to arrive, add a seed-type feeder. If this feeder becomes overcrowded, add one or two more, including at least one suet feeder.

Placement of feeders is important. For example, no bird likes a feeder directly exposed to the wind. A rule of thumb is to place hanging and stationary types five or six feet off the ground and eight feet from heavy cover where predators could hide.

Suet feeders can be designed to include or exclude certain species. Smaller birds will use the suet bag or pine cone; they provide insecure footing for larger perching birds. A large, well-secured suet board will attract both small and large birds. A suet log with smooth bark may not be used at all, but if dowels are placed one inch below the holes, chickadees, jays, finches or sparrows will often take your offerings. A log with coarse bark and no dowels will be used by flickers, other woodpeckers, nuthatches, brown creepers and other tree-climbing birds.

Like suet feeders, hanging seed feeders can be designed for a selected clientele. Feeders such as the droll yankee, lantern and satellite (which are often purchased) and the bleach jug (which is easily made) work on the "hopper" principle—they store and provide food continuously. These features become essential when temperatures drop below freezing and when you are not around. Chickadees, finches, pine siskins, sparrows and juncos will use the lantern, bleach jug or similar "hopper" feeders. The droll yankee and satellite types cater to pine siskins, finches and chickadees.

Red crossbill photo: Dean Biggins

Hanging tray feeders, such as the dome type, provide a limited amount of food; they must be replenished more often than the hopper type. Depending on size and stability, large or small birds will use these types. The hanging coconut half-shell is a special feeder, which can also be hung on its side. You can place a suet mixture in it or just seeds.

Stationary feeders can be either hopper or tray types. Because these feeders are the most stable, the greatest variety of birds will use them. The ground tray feeder

Dark-eyed junco photo: Dean Biggins

Evening grosbeaks photo: Louis Moos

Pygmy nuthatch photo: Alan Nelson

should be at least one foot off the ground, as opposed to five feet for the others. It too should be placed in the open, at least eight feet from dense cover.

Another good place to offer suet mixtures is the bark of trees. Smear the suet mixture on a tree with coarse bark and watch closely; a pygmy nuthatch may come your way.

The object of feeding birds in winter is to *supplement* the natural food supply, not to replace it with an artificial source. During the cold months, birds need some natural foods, protection from adverse weather and security from predators. These additional needs can be met with plants you can grow in your yard.

WHAT CAN YOU PLANT?

Plants serve many functions for both man and birds. In summer, trees, shrubs and ground cover offer birds nesting sites and insects and at the same time provide attractive landscaping. During cold weather, the food and protective cover these plants offer enable birds to remain in good physical condition.

Variety begets variety. A mixture of trees, shrubs and ground cover will attract the greatest variety of birds. There is more to landscaping than just sticking plants in the ground. Evaluate the characteristics of your yard, considering these basic "birdscaping" points:

- Choose plants that fit and enhance your yard, and meet the birds' food and cover requirements.
- Know something about the plants you select. How tall will they be at maturity? Will they bear fruit or seeds? A county extension agent can help answer some of these questions. (See the "Additional Reading" section for some helpful publications.)
- Start by planting large trees. Then, work down through smaller trees, tall shrubs, small shrubs, vines, ground cover and finally the annuals and perennials.
- Find out where you can obtain various plants. Government agencies can provide you with some, while nurseries have others. Removing certain native plants from public lands may be illegal, so check before digging.
- Groups of evergreens provide the densest cover. They should be placed so they offer protection from prevailing winds, as well as good cover for birds.
- The perimeter of the lawn should be moderately to thickly planted with trees and shrubs of varying height, with the lawn area relatively open.
- Where space is available, develop a bird jungle. Allow a mixture of trees, shrubs and vines to grow wild.
- Do not expect results overnight. Plants grow at different rates and birds are unpredictable in their behavior—so relax and let nature take its course.
- Before planting, find out if there are birds in your area that use those plants. Audubon Society members can help.
- Remember, placement of feeders for birds is important, but place them so you can see them too. No matter what size your yard, you can create a year-round habitat for birds.

Hairy woodpecker photo: Dean Biggins

BIRDS CAN OFFER MORE

Birds are more than pretty subjects to feed, furnish habitat for and watch. They are creatures of the wild with complex physiology, behavior and needs.

Watch the feeding methods each species uses. A junco may scratch the snow below a hanging seed feeder at which finches are feeding. The white-breasted nuthatch probes the bark of trees searching for dormant winter insects while climbing up, down or around the trunk; the brown creeper starts from the bottom and spirals upward. You may see a jay bolt down one sunflower seed after another, while other birds laboriously crack the seed open first.

In addition to food, water is important to birds in winter. Maintaining ice-free water during a Montana winter is difficult, but there are ways. A pet shop owner

Mountain chickadee photo: Alan Nelson

may have some suggestions. Your unfrozen waterhole may be as popular as your feeding stations. In fact, it may act as a magnet, drawing birds from miles around.

Location of a water bath is handled similarly to that of a feeder; place it one or two feet off the ground and well away from places where predators may hide. Steep-sloping baths or those with narrow steel rims are undesirable. A depth of one-half inch at the edge sloping to three inches in the center is best. Periodic cleaning is essential.

Weather conditions greatly affect the activities of birds. During subzero weather, your feeders may be swamped, while during more favorable weather, they may be barren. The greatest variety of migrating birds may arrive during rapid changes in the weather. Birds will probably use your feeder most in late winter or early spring, prompted by an exhausted natural food supply.

Table 3
Suet Mixture Recipes

(From "A Complete Guide to Bird Feeding," by John V. Dennis. Copyright © 1975 by John V. Dennis. Reprinted by permission of Alfred A. Knopf, Inc.)

Recipe 1

Heat to boiling:
6 c water
1 c shortening or melted suet

Add:
2 c cornmeal
½ c flour
1 c white or brown sugar, or honey or syrup

Mix and bring to boil. Cover and turn off heat. Finally, add seeds, raisins, nutmeats, peanut butter or other tidbits which may seem appropriate. Pour into pans and chill before placing at feeders.

Recipe 2

3 c melted suet
1 c cornmeal
1 c peanut butter
1 c bird seed or nutmeats
1 c coarse brown sugar
1 c raisins or currants

Combine ingredients and add enough water to achieve the consistency of porridge. Cook over hot water until blended. This mixture is for use at coconut half-shell feeders or other hanging feeders that exclude certain species. It is a rich mixture well liked by birds in winter.

Recipe 3

2 c melted fat (beef suet, lard, bacon drippings or any fat that does not contain rich seasonings)
2 c cornmeal (yellow preferred)
1 c peanut butter

Stir cornmeal, peanut butter and any other suitable ingredients into melted fat and cook for several minutes. Pour into shallow cups or dishes suitable for use at feeders. Handy dishes can be made by cutting down cardboard milk cartons to a desirable size. After mixture has solidified, wedge filled containers into holders or stuff them into the holes of a suet log. This is necessary if they are to remain in place while the birds feed.

Additional Reading

The following publications offer more detailed information on identifying, feeding and providing habitat for birds. Many of these can be easily obtained at your local library or through the library loan system.

Anonymous, "Trees and Shrubs for Montana," Montana Cooperative Extension Service, Montana State University, Bozeman, Mont., Bulletin No. 323, 1969, 35 cents. A useful guide with good photos of trees and shrubs you will find in Montana.

Bourne, R., editor, "Gardening With Wildlife," National Wildlife Federation, Washington. D.C., 1974, $12.95. A very good book that tells how to make your backyard attractive to all forms of wildlife.

Dennis, J. V., "A Complete Guide to Bird Feeding," Alfred A. Knopf, Inc., New York, N.Y., 1975, $10. An excellent book that covers all aspects of feeding birds except what to plant.

Editors of Sunset Books and *Sunset* Magazine, "Attracting Birds to Your Garden," Lane Books, Menlo Park, Calif., 1974, $1.95. This book deals with what you can plant for birds, as well as feeding and housing.

Martin, A. C.; Zim, H. S., and Nelson, A. L., "American Wildlife and Plants: A Guide to Wildlife Food Habits," Dover Publications, Inc., New York, N.Y., 1951, $3.95. A useful guide for determining the use of trees, shrubs, weeds and herbs by birds and mammals.

Marriage, L. D., "Invite Birds to Your Home: Conservation Plantings for the Northwest," Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C., 1975, 85 cents. A general, but excellent, guide for determining what to plant for birds.

McCarver, O., "Ornamental Plant Materials," Montana Cooperative Extension Service, Montana State University, Bozeman, Mont., Bulletin No. 305, 1966, free. This publication does not cover birds, but is extremely specific and useful for helping Montanans decide what to plant.

McElroy, T. P., Jr., "The New Handbook of Attracting Birds," Alfred A. Knopf, Inc., New York, N.Y., 1960, $8.95. A book which deals with all aspects of attracting all kinds of birds.

Peterson, R. T., "A Field Guide to Western Birds," Houghton Mifflin Co., Boston, Mass., 1961, $6.95. This guide covers birds of the western half of North America, including an excellent description of each species.

Robbins, C. S.; Bruun, B., and Zim, H. S., "Birds of North America," Golden Press, New York, N.Y., 1966, $3.95 paperback. A field guide for the identification of birds, containing colorful pictures, distribution maps and brief descriptions.

Dear F&G

Readers Praise MO Photographers

Danny On is a fabulous photographer; I surely enjoyed his photograph of the bitterroot on your May/June 1978 cover as I have a beautiful bed of our state flower growing in my yard.

Around mid-June, I have had as many as 100 flowers open in one day. I have about 40 plants of different sizes and one had more than 40 buds.

I save the seeds and would like to give them to someone who would plant them or sow them somewhere they might grow.—*Mrs. Clarence Allderdice; Big Sandy, Mont.*

• *For more information about obtaining bitterroot seeds, write Mrs. Allderdice at Box 160; Big Sandy, MT 59520.*—Ed.

* * * * *

Montana Outdoors improves with every issue and your July/August 1978 magazine is no exception. Big game hunting in Alaska can't be surpassed, but every year since moving to Alaska, we still return to northeastern Montana for good scatter-gun hunting.

I just had to compliment Jon Cates on the outstanding photograph of the black Labrador on page 3 of the July/August issue—a beautiful Lab and a beautiful photograph. Many thanks.—*Jim and Millie Hillstrom; Palmer, Alaska*

Too Much Controversy

I'm writing to say that I have seriously considered cancelling my subscription. Too often the magazine has 25% about Montana's wildlife and the rest is all about controversial subjects. I realize that, to an extent, the two are intertwined, but I still subscribe to *Montana Outdoors* to keep in touch with Montana's wildlife and not to be constantly bombarded with people's opinions.—*Tim Jacobsen; Veradale, Wash.*

A Fitting Memorial

I can't think of a more fitting memorial for our son, Doug, than the Helena Super Save Grocery employees' donation to the Department of Fish and Game for purchase of land for wildlife management purposes. (See "The Catchall," *Montana Outdoors*, Sept./Oct. 1978.)

Doug's life was filled with many enjoyable hours dry fly fishing the Little Blackfoot, fishing the Missouri near Helena, bow and arrow hunting in early fall, bird hunting and big game hunting in late fall. Doug did in fact love the Big Sky Country, as all who knew him realized.

We feel extremely pleased that during his short life he was able to understand what the outdoors meant and the pleasures it offered. Thank God he lived in Montana.

Thanks to our Super Save friends who were so thoughtful.—*Barry and Betty Trent; Helena, Mont.*

Emphasize Hunters Less

As a subscriber of several years to your magazine, I'd suggest that *Montana Outdoors* place less emphasis on hunting and hunter prerogatives. I don't hunt, I never plan to, but I do appreciate the outdoors.

Already there is talk about hunting on Wild Horse Island. Does this handful of hunters think they own the country? I think it is wonderful that Montana did acquire Wild Horse Island.

I think more emphasis needs to be placed on nature studies, hiking, camping and visiting opportunities for the nonhunting public.

I hope *MO* fights this uncontrolled natural burning in national parks. What's a visitor from smoggy Chicago going to say when he comes to smoke-filled Going-to-the-Sun Highway or McDonald Creek Valley? This is exactly what happened to my wife and me in fall 1974. There was a pall of smoke from Yellowstone National Park to Jackson Lake from a so-called natural burning. The smoke was unbearable. We could see the flames along the lake's edge. "The Park Service is going nuts" is what John Q. Citizen will say—and rightfully so. I know this is not in your prerogatives from a management stand, but you can lend your spiritual and moral resistance

Wildlife Shorts

Fish suffocate whenever the oxygen supply in water dwindles below what they need to breathe and they can't get enough to supplement it. In this sense, they can drown.

* * * * *

When are fawns weaned? Studies show they are weaned by about four months. Many fawns are on full vegetation diets by early September and by the first of October, most are no longer nursing.

* * * * *

How long do deer live? Deer that live for an unusually long time seem to be those in captivity or those that are semidomesticated pets. The present record is a deer which lived for 19 years.

* * * * *

Fish sleep like people—tired fish relax into unconsciousness just like you and I do. Unlike man, they have no eyelids, so their eyes are perpetually open. This gives the observer the impression they are always awake.

* * * * *

Moths and butterflies winter in any of the four stages of their development (egg, larva, pupa or adult). Because of the cold winters in Montana, many of the more highly evolved moths and butterflies spend the winter in pupation.

* * * * *

A bee dies after it stings. A bee's stinger is equipped with backward pointing barbs and after the stinger has been plunged into a victim, it is almost as inextricable as a fishhook or a porcupine's quill. As the stinging bee struggles to get away, its embedded stinger is pulled out of its body and the bee dies. —*Vince Yannone*

recycled paper

to this practice. Besides, it's better to do natural burning in the winter; then John Q. Citizen can't see it.—*Herbert DeVries; Polson, Mont.*

Protect Wildlife

I would be sending this check for my subscription renewal much more willingly if you would protect your wildlife—especially grizzly bears, cougars *and* coyotes. I wish you could send some of these animals to Bucks County, Penn.—*Marion E. Neill; Sellersville, Penn.*

Unsportsmanlike Conduct

I am absolutely appalled at the present-day lack of sportsmanlike conduct demonstrated by some hunters.

Recently, my son and two companions hiked about four miles into the Lincoln backcountry for a special elk and deer early season hunt near Heart Lake. They set up camp, slept and started out early to try to locate game. When they returned to camp, their entire three-day supply of food had been stolen: eggs taken from cartons and the cartons neatly replaced, food gone from backpacks and zippers again closed. Thank heaven only food was missing. But what a rotten trick! The boys had to return to town two days early after getting time off work, driving and hiking—only to have the whole trip ruined by some ignorant slob.

I do hope the thieves learn Montana hunters' ethics before someone feels it necessary to teach them by guarding their camp with a loaded shotgun.—*Pauline Semmens; Helena, Mont.*

License Increase Reduces Attractiveness

I subscribed to *Montana Outdoors* because I once hunted in your state. The recent license increases and declining deer population in southeastern Montana have reduced the attractiveness of Montana for me as an out-of-state hunter.

The $50 small game license requirement for entering the big game drawings (mainly deer) has accomplished its purpose. A $100 license for deer and small game is reasonable. A week's vacation to hunt small game only (when the deer drawing is unsuccessful) is unreasonable. It's much closer to travel to other states such as North and South Dakota; hence, less vacation time is needed.

I hope the deer herd in southeastern Montana will come back. It was fantastic in 1972, good in 1974 and so-so since. Good luck in the effort.

MO is a good Montana magazine.—*R. L. Harris, Jr.; Hinsdale, Ill.*

Writer Suggests MO Cover Shot

I'm a happy subscriber to your magazine. I especially enjoyed the "Wild Edibles" article in your May/June 1978 issue.

I'd like to suggest a superb photo for your cover. I didn't bring my camera to Montana on our last trip and was very sorry. The photo includes an abandoned old homestead against a green hillside, blue sky and many large poppies in full bloom (we were there in late June). If you know a camera buff living in the area, the spot is situated two miles west of Absarokee on the left side of the road leading to Cliff Swallow Fishing Access Site on the Stillwater River.

It is an absolutely beautiful sight and if someone takes a picture, I'd love to buy a color negative to enlarge.—*E. M. Nelson; Litchfield, Minn.*

Christmas Bird Count: A Holiday Tradition

by Mike Aderhold

On Christmas Day 1900, Frank Chapman—hunter, taxidermist and assistant curator of birds and mammals at the American Museum of Natural History in New York—organized an outing to observe birds. He proposed, ". . . spending a portion of Christmas Day with the birds and sending a report of the 'hunt' to *Bird Lore* . . . ," a magazine he and his wife launched 11 months earlier from their Englewood, New Jersey, home. Twenty-seven persons from 25 localities participated in the first count. Pacific Grove, Calif. turned in the high count of 36 species and Chapman observed 18 species around Englewood.

Chapman (1864-1945), who left school at 16, went on to write 15 books and over 200 technical papers and became this country's first noted bird photographer. With his colleagues at the American Museum of Natural History, he established the most extensive bird collection and display in the world. At the time of his death, he was recognized as the dean of American ornithologists. *Bird Lore*, which Chapman edited for 36 years, evolved into *Audubon*, an award-winning magazine with a current circulation of more than 300,000. Many readers regard it as the most beautiful natural history publication available.

The bird outing Chapman initiated has become an international, annual, 16-day happening known as the Christmas Bird Count. This event is now one of the most impressive wildlife surveys in the world. Recent counts have involved over 30,000 formal registrants, close to 50,000 participants, more than 1,200 counting units and a tally in some years (1975) of over 124 million birds. Almost every year, the count has set new records for participation, number of count areas and species recorded.

Most early counts had only one observer and lasted only two or three hours. Today, many counts have developed into complicated undertakings with over 150 participants. They take on aspects of military maneuvers—dividing into committees or squads with captains and scouting groups, bird dogs and spotters, judges and juries, feeder watchers and owl guides. The groups with the highest counts usually are athletically competitive. Still, most counts are made by small groups of people of various ages, backgrounds and experiences who just share an interest in birds. They participate for the fun of spending some time outdoors together observing wildlife. They enjoy the excitement of the hunt, companionship afield and the common satisfaction of seeing and/or learning something new. About 250,000 individuals have shared the count experience.

Since 1970, the number of counters has doubled and the number of count areas has increased by more than one-third. Christmas counts are now conducted in every state, most of the Canadian provinces, many major islands in the West Indies and several countries

in Central and South America. The results of the counts are published in the July issue of *American Birds*. In 1978, the July issue of the bimonthly publication was more than an inch thick and contained 521 pages. In the last six years, subscriptions have more than quadrupled.

This parallels a phenomenal growth in the recreational activity of birdwatching. Using the sale of bird feed, binoculars, bird books, bird organization memberships, etc. as indicators, some believe interest in birding may attract as many as 11 million persons in the United States. The *American Birds* editor conservatively estimates that at least 500,000 people ". . . own bird books and binoculars . . . and go birding regularly. . . ."

Through the years, the Christmas count has developed a few specific rules and a standard reporting system. From the start, Chapman required that all bird reports include locality, hour of starting and returning, character of the weather, direction and force of the wind and the starting temperature. By 1908, the count period had been extended to one week and it is now a 16-day span involving the last two weeks in December and a few days in January. In 1916, limits of each count area were established as a circle 15 miles in diameter (167 square miles), with some exception for linear boat counts. Later, the count time was defined as one calendar day with dawn-to-dusk efforts encouraged. All U.S. reports must now be made on specific forms which are reviewed and checked by 26 regional editors. Counters must provide details about unusual sightings and the editors do not process sloppy or incomplete reports.

The exercise has generated more than good times—the counts represent a great deal of valuable scientific information. Past counts reveal information about distribution and changing winter ranges for some species. By looking at several years of information, observers can get some idea of changing numbers, dramatic movements, unusual declines and species new to an area. The number of scientific studies utilizing Christmas count statistics has increased yearly. Counts back to 1941 are now being computerized and will be available for serious study.

The annual list of participants provides names of birding enthusiasts from many parts of the country. It is not unusual for active birders to receive calls or letters from strangers asking about particular species or local birdwatching hot spots.

Another benefit is education: The counts have stimulated interest in birds and inspired some people to develop and advance this interest. The counts have taught that there is more to birds than

The 167 Birds Observed on 263 Christmas Counts over 64 Years

Common loon
*Red-throated loon
*Red-necked grebe
Horned grebe
*Eared grebe
Western grebe
Pied-billed grebe
Great blue heron
*Mute swan
Whistling swan
Trumpeter swan
Canada goose
*White-fronted goose
Snow goose
Mallard
*Black duck
Gadwall
Pintail
Green-winged teal
Blue-winged teal
*Cinnamon teal
American widgeon
Northern shoveler
Wood duck
Redhead
Ring-necked duck
Canvasback
Greater scaup
Lesser scaup
Common goldeneye
Barrow's goldeneye
Bufflehead
Oldsquaw
Ruddy duck
Hooded merganser
Common merganser
Red-breasted merganser
*Turkey vulture
Goshawk
Sharp-shinned hawk
Cooper's hawk
Red-tailed hawk
Swainson's hawk
Rough-legged hawk
Ferruginous hawk
Golden eagle
Bald eagle
Marsh hawk
*Osprey
*Gyrfalcon
Prairie falcon
Peregrine falcon
Merlin
American kestrel
Blue grouse
*Spruce grouse
Ruffed grouse
Sharp-tailed grouse
Sage grouse
Ring-necked pheasant
*Chukar
Gray partridge
Turkey
*Virginia rail
*Sora
American coot
Killdeer
Common snipe
*Spotted sandpiper
*Glaucous gull
Herring gull
California gull
Ring-billed gull
Rock dove
Mourning dove
Screech owl
Great horned owl
Snowy owl
Pygmy owl
*Great gray owl
Long-eared owl
Short-eared owl
*Boreal owl
Saw-whet owl
Belted kingfisher
Common flicker
Pileated woodpecker
Lewis' woodpecker
*Yellow-bellied sapsucker
Hairy woodpecker
Downy woodpecker
Black-backed three-toed woodpecker
Northern three-toed woodpecker
Horned lark
Gray jay
Blue jay
Steller's jay
Black-billed magpie
Common raven
Common crow
Piñon jay
Clark's nutcracker
Black-capped chickadee
Mountain chickadee
*Boreal chickadee
Chestnut-backed chickadee
White-breasted nuthatch
Red-breasted nuthatch
Pygmy nuthatch
Brown creeper
Dipper
Winter wren
Long-billed marsh wren
*Cañon wren
*Brown thrasher
American robin
*Varied thrush
*Mountain bluebird
Townsend's solitaire
Golden-crowned kinglet
Ruby-crowned kinglet
*Water pipit
Bohemian waxwing
Cedar waxwing
*Phainopepla
Northern shrike
Loggerhead shrike
Starling
House sparrow
Western meadowlark
*Yellow-headed blackbird
Red-winged blackbird
*Northern oriole
Rusty blackbird
Brewer's blackbird
Common grackle
Brown-headed cowbird
Evening grosbeak
*Purple finch
Cassin's finch
House finch
Pine grosbeak
Gray-crowned rosy finch
Black rosy finch
*Brown-capped rosy finch
*Hoary redpoll
Common redpoll
Pine siskin
American goldfinch
Red crossbill
White-winged crossbill
Rufous-sided towhee
*Savannah sparrow
*Vesper sparrow
Dark-eyed junco
Tree sparrow
Chipping sparrow
Harris' sparrow
White-crowned sparrow
White-throated sparrow
Fox sparrow
*Lincoln's sparrow
*Swamp sparrow
Song sparrow
*McCown's longspur
Lapland longspur
Snow bunting

* Unusual Christmas count sightings, recorded less than five times. Some of these species are common in Montana in the summer but rare at Christmas, while others are common in parts of Montana during the winter but rare in the Christmas count areas. While officially accepted by the Christmas count editors, a few of the above species are not well documented and are held suspect by some Montana bird authorities. From "Montana Christmas Bird Counts—A 1908-73 Summary," by Dr. Clifford V. Davis, updated through 1977 by Mike Aderhold

looking at them; there is their environment to consider and causes and areas to support. The public is just now starting to appreciate the value of wild animals as indicators of environmental change and condition.

Montana's Christmas count history extends back to the first decade of the century and has been painstakingly reviewed and documented by Dr. Clifford V. Davis, retired professor of ornithology at Montana State University, Bozeman, and member of the Department of Fish and Game's Montana Citizens' Nongame Advisory Council. According to Dr. Davis' notes, the first Montana count was conducted in the Bozeman area by Aretas A. Saunders in 1908. Montana counts have been made in 64 of the 70 years since. The six-year period from 1920-25 was the only gap. A total of 263 reports have been recorded from Montana through the 1977 Christmas count. (An additional 17-18 counts will probably be added from the 1978 Christmas tally by the time this issue of *Montana Outdoors* is circulated.)

Over the last 70 years, counts have been conducted in 29 different areas in Montana (see map). Ten areas have conducted counts only once. Through 1977, the top count areas have been Bozeman, Billings, Fortine and Helena with 39, 34, 28 and 23 counts, respectively. Fortine, a little community with a population of less than 100 persons in extreme northwestern Montana between Whitefish and Eureka, was counted 28 times over a 31-year period by Winton Weydemeyer, former state senator and long-time farmer.

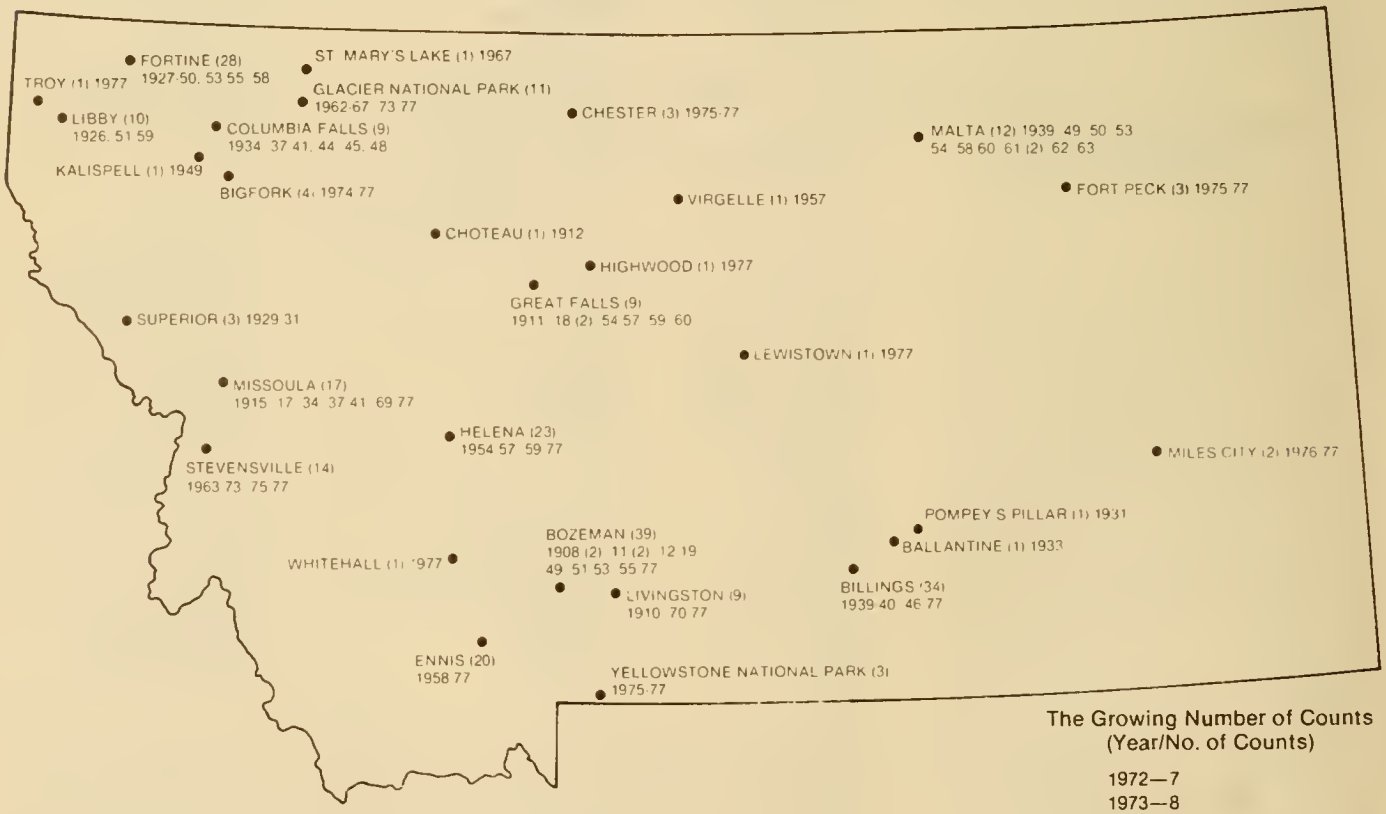
The total Bozeman (39 years) and Billings counts (34 years) were summarized in 1977, and through the years they have documented 89 and 114 species, respectively. Of the 357 species known to reside in or have visited Montana, 167 have been recorded during the Christmas counts.

In Montana in 1977, 291 observers working 17 counts saw 67,232 birds of 129 different species. Missoula has had the high count the last several years and the 74 species picked up by its 30 observers in 1977 is the state's high count to date.

Interest in this kind of activity is growing around the state. The number of Montana Christmas counts has more than doubled in the last six years. The state also has a number of formal breeding bird surveys and raptor surveys. Many hunters as well as nonhunters have taken up birdwatching and wildlife photography and enjoy the "hunt" year around.

Five chapters of the National Audubon Society exist in Montana and they have recently organized into a Montana Audubon Council. Many Fish and Game regional offices now receive almost as many calls about bird identification and nongame species as they do about waterfowl hunting and trapping. All this attention can only further the interest of wildlife in Montana.

Montana's Published Christmas Bird Counts (Location/number of counts and the years performed through 1977)



The Growing Number of Counts (Year/No. of Counts)

1972—7
1973—8
1974—8
1975—12
1976—13
1977—17
1978—(18 projected)

From "Montana Christmas Bird Counts—A 1908-73 Summary," by Dr. Clifford V. Davis, updated through 1977 by Mike Aderhold

photo: Vince Claerhout

AS TIME GOES BY . . .

Spring turns into summer, and summer, in turn, changes into the golden brown time of year we call autumn. The whirling, wrinkled leaves herald the feathery white season we call winter—the time when the old year passes into history and a new year with all its promise emerges.

What better way to mark the birth of a new year than with a 1979 Montana Outdoors *Wildlife Calendar? The white-tailed deer fawn pictured above is only one of 12 appealing photographs which headline each new month.*

To obtain the calendar, send $3 for each personal or gift order to: Montana Outdoors, *Department of Fish and Game; Helena, MT 59601.*

Christmas at Big Prairie

article and photos by Steve Gilbert

• For most of us, Christmas is a time for brightly wrapped gifts, warm fireplaces and family gatherings. Not many people would dream of spending it in the middle of the Bob Marshall Wilderness. But that's exactly what cross country skiers Steve Gilbert and Pete Husby did one winter.

Their explanation: "At first, the thought of Christmas away from friends seemed dismal. But the more we thought about it, the more the idea grew on us. Why not, at least this once, trade the slushy streets, car exhaust and last-minute shoppers for tubes of green wax and a long trek in the cold snow?"

Considering that winter in Montana is a beautiful time to be outdoors, why not indeed? —*Ed.*

* * * * *

December 22

The North Fork of the Blackfoot near Ovando. Satin-smooth wax for the first stretch of trail seems appropriate. It will be globbed on cold and lumpy after this, but now our skis are warm and our spirits high. Cork it smooth, clamp boots to pins. Our packs seem light and the wax just right—an effortless kick and glide up the road to the trail head.

It is nice to be on an adventure, heading north through the Scapegoat Wilderness to ski the length of the Bob Marshall to Spotted Bear Ranger Station. Skis in dry snow swish rhythmically; their music is hypnotic and mind-freeing, allowing us to forget sore shoulders and cold feet. Familiar landmarks from summer hiking trips slide by: Big Slide, Smoke's Cabin Bridge, the North Fork Cabin. Pete and I trade trail-breaking duties frequently . . . stay loose, don't get too tired in the lead and keep nibbling goodies . . . keep those calories flowing in.

We have a good rest on the cabin porch, a cold, sweet orange and long gulps of river water before heading up the Dry Fork to the Flathead Divide. Tracks in the snow remind us we are not alone: a good-sized set of lion tracks meanders along the Dry Fork below the red bluffs; we cross them intermittently until we reach the basin and the dense lodgepole to the north.

We pitch our tent under a big lodgepole near the crossing on Cabin Creek. A hot meal and cups of hot chocolate . . . then drooping eyelids as the light fades. Twelve or 14 hours until dawn doesn't seem too long to be stretched out. On winter trips, when night settles in, there's little to do but curl up in a warm sleeping bag and wait for tomorrow.

December 23

Long ribbons of frost drop on our faces from the tent roof, signaling the arrival of dawn. After breaking camp, we cross Cabin Creek on a blown-down spruce, carrying our skis. The hike up Whiskey Ridge warms our hands and feet, and early sun on Danaher Mountain warms our faces. The run along the ridge is fast; it is exhilarating to ski up through the sagebrush meadows and along the willow- and birch-fringed course of Dwight Creek.

In the afternoon, we cross the Flathead Divide into Danaher Creek, a main tributary of the South Fork of the Flathead. After a quick run down the divide, we stop in the sun along the wide flats of the Danaher to stretch, relax and dry the frost from our sleeping bags.

As we head downstream toward The Basin, a herd of elk moves out in front of us, running effortlessly through the snow-covered sage.

The alpenglow lights up Twin Peaks and Scarlet Mountain as we ski around the bend into the The Basin. Camping at dark near the timber's edge, we are lulled to sleep by the gurgling Danaher.

December 24—Christmas Eve

The day dawns clear and well below zero. After cereal, coffee and cocoa, we ski north again—this time with sore toes and fingers. It's cold, but the day begins well on good snow, ski tips kicking up flurries of sparkling ice crystals. But as we head into the canyon near the confluence of Danaher Creek with Young's Creek, the snow thins out—rocks and fallen

branches protrude in places. On one downhill stretch, an unnoticed rock brings my progress to a screeching halt, pitching me forward on my face. The weight of my pack helps bury my ski tips in my chest, and my right thumb bends painfully backward. This swollen, throbbing thing in my mitten reminds me for the next few days that I am not skiing on the golf course in Missoula, with the doctor's office a mile away.

The dense lodgepole flats along the South Fork of the Flathead drag interminably, and we arrive at Big Prairie late and tired. The Forest Service cabin is locked this Christmas Eve, so we choose the front porch for our banquet hall. Christmas Eve dinner! A goose with stuffing? A venison roast? A turkey with mashed potatoes, rich brown gravy and cranberry sauce? No, a freeze-dried dinner—beef stroganoff garnished with cold shudders.

To keep from dwelling on wistful thoughts of Christmases past, we decide to take a pleasure tour along the South Fork. Freed from the burden of backpacks, we seem to fly across the snow. It's a beautiful evening, complete with a small band of elk staring curiously, wet snowflakes in our faces and a coyote serenade.

Back on the shelter of the porch, we fire up our backpacking stove to heat water for hot lemonade—to mix with the flask of brandy we have carefully hoarded for our Christmas cheer. Not quite hot buttered rum in front of a warm hearth, but the lemonade courses through our veins with a welcome warmth. Howl, you coyotes! Howooool to the east, howooool to the west! We laugh till the tears flow. Two more hard days to Spotted Bear, but Christmas at Big Prairie is the realization of a long-standing dream, and tonight we are completely at peace with our snowy world. ■

Soon after blasting (top), potholes fill with water, providing habitat for many species of surface-feeding ducks. A pothole (above) is blasted at the department's recently acquired Elk Island Fishing Access Site and Wildlife Management Area near Savage. "ANFO," an inexpensive but highly effective commercial mixture of ammonium nitrate and fuel oil (left), is prepared for detonation. (F&G photos: Dave Books)

Pothole Blasting:

A Step Toward Wetland Restoration by Ken Walcheck

IN MAY 1978, a small group of Montana Department of Fish and Game biologists took cover behind a dike surrounding a lowlands area on the department's recently acquired Elk Island Fishing Access Site and Wildlife Management Area near Savage. They were assembled to watch a low-cost blasting material create new waterfowl habitat.

The roar of the blast rolled across the flat terrain like a giant thunderclap. Tons of soil and other debris rocketed hundreds of feet into the sky and although we were standing nearly a quarter of a mile away, the ground shook as the shock waves hit.

Before the blast, we had seen a few ducks trading back and forth over the area. After the explosion, several flocks of mallards erupted from near-by ponds, scrambled for altitude and then circled in alarm and confusion. What they didn't realize, of course, was that the detonation was for their benefit.

Under the guidance and expertise of Frank Gjersing, a department game biologist in Havre, we were

blasting potholes with an inexpensive but highly effective commercial mixture of ammonium nitrate and fuel oil (ANFO). ANFO is not classed as an explosive, but as a "blasting agent."

Use of ANFO as a blasting agent has gained wide acceptance in the wildlife field. Its relative safety, simplicity and economy make it increasingly useful wherever marshes and other potential waterfowl habitats lack open water. Wisconsin, Michigan, Minnesota, Iowa, Maine, Ontario, Manitoba and a number of other states and provinces have used the technique as a management tool. During the past decade, department biologists have used ANFO in Montana to blast potholes at Fox Lake, Whitewater Reservoir, the Fort Belknap Indian Reservation and numerous marshes on private lands. Tentative future management plans include blasting at Canyon Ferry and the Fresno Wildlife Management Area.

While pothole blasting is relatively simple in the hands of an experienced and qualified person, it should be emphasized that many federal, state and local laws, ordinances and regulations govern use of explosives and blasting agents. Most important, ANFO should be used only by properly qualified individuals.

Today, commercial mixtures of ANFO are available for blasting use. However, some state agencies prefer to mix their own. To initiate the detonation, a prepared booster (primamite or dynamite) is inserted into the ANFO; the booster provides the heat and shock needed to trigger the explosion (actually a rapid uniting of fuel oil with the oxygen in the ammonium nitrate). When a simultaneous detonation of multiple charges is desired, a detonating cord (prima-cord) is used.

Depending on the soil type and moisture conditions, ponds of almost any desired shape or size can be created. In one experimental blast at Elk Island, we used six 25-pound bags of ANFO (two bags per six-foot hole spaced six feet apart) to blast a crater 25 feet wide and eight feet deep. Materials, excluding labor, to blast the egg-shaped crater cost about $15. In another multiple-test shot in the same area, 52 bags or 1,300 pounds of ANFO were spaced at six-foot intervals to blow a lopsided L-shaped trench 7-10 feet deep, 25-30 feet wide and 170 feet long. In one large blasting test in Saskatchewan, a 14,000-pound charge blew a cavity 18 feet deep, 85 feet wide and 280 feet long.

For the best results, pothole specifications for Montana should meet the following standards:

- Minimum water surface should be 500 square feet.
- Depth of the hole should be at least 3½ feet over 25% of the surface.
- When run-off water is inadequate, the water table should be within two feet of the surface.
- Suitable brood habitat should exist within one mile or less.

Blasted potholes quickly fill with water and "dabblers" or surface-feeding ducks such as teal, shovelers and gadwall are readily attracted to such ponds. Diving ducks such as canvasbacks and scaup favor larger bodies of water and seldom utilize the smaller potholes. These potholes function primarily in providing seclusion for mated pairs to establish territories and carry on courtship activities. Although the hen and brood may briefly utilize the pothole, brooding (the covering, warming and hatching of eggs) usually takes place near an adjacent larger body of water located within one-half to one mile.

The spoil banks bordering the ponds also provide a useful function. At Delta, Manitoba, a two-year study showed that waterfowl used spoil banks as resting spots and lookouts. Researchers found that ducks visiting the ponds

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spent 86% of their time on top of the spoil banks, less than 10% at the water's edge or in the water and less than 5% feeding.

How effective are blasted potholes in attracting waterfowl? The answer depends on the potential of the waterfowl site, availability of nesting cover and proximity of the potholes to suitable brood habitat.

Several states have been successful in attracting ducks with pothole blasting. In a 1968 survey of waterfowl use on 173 potholes blasted with ANFO in Minnesota, 89 sites (51%) actually were used by ducks. Forty-three breeding and courting pairs were recorded.

A 1966-68 study in Nebraska of waterfowl use of blasted potholes on the Valentine National Wildlife Refuge indicated the potholes were quite effective in increasing waterfowl numbers. In 1967, 31 pairs used 23 (62%) of the 37 potholes blasted in 1966. In 1968, 132 pairs used 82 (68%) of the 120 potholes available. A comparison of the 1968 breeding pair surveys to the averages of those made in 1964-67 showed a 160% increase on developed shorelines (areas in which blasting occurred) while the undeveloped shorelines showed a 3% decrease in paired birds during the same time frame.

Another management effort that holds a great deal of promise is blasting portions of narrow peninsulas to create islands. In eastern Montana, many islands have been constructed in this manner by the Department of Fish and Game and the Bureau of Land Management. Research shows geese prefer islands as nesting sites and nesting success is much higher on islands than on the mainland. Islands are inexpensive to create and require little, if any, maintenance. Construction of islands on reservoirs will continue to expand waterfowl populations.

Pothole blasting won't solve the entire problem of declining duck populations. It offers but a tiny lifeboat to waterfowl, not a large, luxurious passenger liner. I am reminded of an editorial comment by Dale E. Whitesell, executive vice president of Ducks Unlimited, Inc., who pretty well summarized our present waterfowl dilemma: "It seems no cow (duck) is sacred in this day and age, regardless of its virtues and, perhaps, that is as it should be. But for those of us left holding the pail while the cow is unceremoniously milked dry, . . . the chore of conserving the resource has a definite curdling effect."

Obviously, any program that results in a few additional acres of open water in potholes of the right size to meet the needs of ducks is going to help. And today, anything that helps the duck population in the slightest way is definitely worth trying. And though this lifeboat may appear small in the wake of man-caused threats to habitat and natural catastrophes, it still is one step toward wetland restoration.

Today the merits of blasting for ducks have been well established. A few of those "quacks" coming from newly created potholes could be saying "thanks" for the biologists' concern in creating additional habitat. Also, Montana wildfowlers should be pleased with the result of more duck hunting because of this habitat improvement. ■

Contributors

"It's a mile wide, an inch deep, too thick to drink and too thin to plow" aptly describes the Powder River. It originates in central Wyoming and flows 375 miles northward where it joins the Yellowstone River near Terry, Mont. As it did in the Indian campaigns over 100 years ago, the Powder could once again assume a pivotal role in Montana's history: It meanders through the middle of the Powder River Basin Coal Region. Turn to page 2 to find out more about the "Powder River: Historical Underdog." Author **Bruce Rehwinkel** is a fisheries biologist for the department, headquartered in Whitehall. His present study area includes the Jefferson, Missouri and Boulder rivers.

When Theodore Roosevelt said the United States should "Speak softly and carry a big stick . . .," he probably wasn't thinking of the porcupine. But as **Ken Walcheck** points out, "If ever an animal served as an example of how to live in peace by being perpetually prepared for massive retaliation, it is the porcupine." "The Pincushion That Waddles," another in the *Montana Outdoors* series on nongame animals, begins on page 5.

In "Pothole Blasting: A Step Toward Wetland Restoration," Walcheck emphasizes that pothole blasting won't solve the entire problem of declining duck populations. He writes, "It offers a tiny lifeboat to waterfowl, not a large, luxurious passenger liner." To learn more about this program that results in a few additional acres of waterfowl habitat, turn to page 27. Walcheck is the department's information officer in Miles City.

Providing "Winter Fare for Feathered Friends" is an excellent way to learn more about birds. As **Ron Paulick** notes in his article, beginning on page 11, "The ability to identify the winter and summer songs of birds and to recognize them in both their dull winter and bright summer colors makes birding a challenging adventure." He also provides helpful information on birds you might expect to see at winter feeders, drawings of several types of feeders and suggestions on what to feed and plant to assist in supplementing the birds' natural food supply. Paulick is a wildlife management biologist for the Bureau of Land Management in Utah. While living in Billings, he was a member of the Yellowstone Valley Audubon Society from 1976-78.

What began on Christmas Day in 1900 with 27 persons from 25 localities has mushroomed into an international, annual, 16-day survey involving over 50,000 participants. "Christmas Bird Count: A Holiday Tradition" provides more than an opportunity for bird fanciers to get together. The counts generate a great deal of valuable scientific information about distribution and changing winter ranges for some bird species. Author **Mike Aderhold**, the department's information officer in Glasgow and an avid bird watcher, has been the compiler for the Fort Peck Christmas Bird Count for the past four years. He is one of seven Fish and Game employees who participated in the 1977 count. Turn to his article on page 20.

Spending "Christmas at Big Prairie" —in the middle of the Bob Marshall Wilderness—might not be the way most people would choose to spend the holiday. Yet the rhythm of skis in dry snow, steaming mugs of hot chocolate, an exhilarating trek along the top of a ridge, an unexpected herd of elk and ski tips kicking up flurries of sparkling ice crystals weave a magic spell that reminds us that Montana's winter can be a beautiful time to be outdoors. Turn to a recounting of **Steve Gilbert**'s Christmas adventure on page 24. Gilbert is a wildlife biologist for Olson-Elliott & Associates, a Helena consulting firm.

The Pincushion That Waddles
see page 5